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CAN PRODUCTION OF AUTOMOBILES BE STABILIZED BY MAKING THEIR PRICES FLEXIBLE?

By Willford I. King
New York University

In 1935, Gardiner C. Means presented papers[1] the purport of which was to prove that, when commodities are classified on the basis of their respective degrees of price flexibility, it is found that those having great price flexibility tend to show relatively high stability in production, while those having rigid prices show wide variations in output. Despite various attempts which have since been made to belittle the significance of the facts set forth by Dr. Means, and to magnify the influence of other forces, his main thesis has not been undermined, but appears to be clearly supported by all evidence brought to light.

On the basis of the relationship established by Dr. Means, other economists have concluded that one way to make production and employment more stable is to make flexible those prices which have hitherto been rigid. Price rigidity has been found to be very prevalent in the case of articles which come from the factory in a form ready for use by the ultimate consumer. Automobiles are typical illustrations of goods of this type. Since each make of automobile has its own devotees among the public, the producers of motor cars have found it possible to maintain for considerable periods of time the prices which they set on their cars. Therefore Dr. Means says that these prices are "administered." As he has pointed out, such "administered" prices usually show little tendency to decline in response to a weakening of demand. Since this is true of automobile prices, and since, in this field, production and employment have been notoriously unstable, it has been suggested that here is an admirable place to introduce the much needed reform of substituting flexible for rigid prices. Some feel that, in this particular branch of industry, the feasibility of securing price flexibility is enhanced by the fact that production is mostly concentrated in the hands of a very small number of concerns.

The contention that production can be stabilized by adjusting the

[1] For an example of the material set forth, see "Notes on Inflexible Prices," *American Economic Review Supplement*, March, 1936, pp. 22–35.

prices at which cars are offered for sale clearly involves the assumption that the demand for automobiles is relatively elastic; in other words, that a moderate increase in price tends to reduce materially the volume of sales, while a moderate lowering of the price tends to increase sales volume to a marked extent. If it should prove true that the demand for automobiles is inelastic, the argument that price flexibility can be used to stabilize production and employment in this field breaks down, for with an inelastic demand, it would be impracticable to change prices sufficiently to offset the wide variations in demand characterizing the industry.

Presumably, it was the frequent reiterations by various economists of the view that automobile prices ought to be made flexible which finally led the General Motors Corporation to begin an investigation into the shape of the curve representing the demand for automobiles. Some of the results of this investigation are set forth in papers presented at the Detroit meeting of the American Statistical Association and later published by the General Motors Corporation under the title, *The Dynamics of Automobile Demand.* The men primarily responsible for the mathematical procedures involved in estimating the shape of the curve representing the demand for automobiles are C. F. Roos and Victor von Szeliski. In their attack on the problem, they followed largely the paths laid out by previous investigators working along similar lines in other fields, and depended primarily upon two sets of data; namely, records of relative prices of automobiles at different dates, and records of the numbers of cars sold in corresponding periods. For the purpose at hand, neither of these variables can be considered entirely satisfactory, for the total number of cars sold is a composite containing varying proportions of high-priced and low-priced cars, and, as A. T. Court points out on pages 99 to 117 of the report just mentioned, it is difficult if not impossible to construct a highly accurate index of automobile prices.

This latter difficulty arises mainly from the fact that car models are always changing. Even if the basic data were entirely accurate, the investigators would still find themselves facing a very involved statistical problem arising from the fact that price and production records furnish nothing more than a series of points, each of which represents for a given year the intersection of the demand curve with the supply curve. This fact is brought out by S. L. Horner on page 7 of the report. Since the positions and shapes of both supply and demand curves are constantly changing, it is obviously impossible to reconstruct either of them for any given date merely from a record showing the intersections of the two curves at various dates.

What statisticians who are confronted with the problem of studying demand or supply usually do is to assume that the shapes of both supply and demand curves change but little as time passes, but that the curves shift their positions. On the basis of this assumption, they endeavor to estimate the shape of a typical or average supply or demand curve, as the case may be. However, before it is possible to gain any idea of what the normal shape of the curve is, it is necessary to eliminate by statistical means the effects of variations in the different forces causing the demand or supply curves to shift their positions. Important among forces affecting the demand for automobiles are such factors as population, per capita income, the general price level, and the ages, number, and durability of cars in use. Because of the influences of these forces, a series made up of a single point for each of a number of years will not, when plotted, lie in such a pattern as to give any indication of the typical or normal shape of the demand curve. However, if the results of extraneous forces could be completely eliminated, the net residuals would presumably form a fairly definite pattern approaching in shape that which the normal curve of demand for automobiles would have if all these interfering influences remained continuously fixed at their respective average levels. What Roos and von Szeliski have attempted is first to measure the respective intensities of these external influences and then to eliminate as completely as possible the effects of variations in these influences. This very difficult task seems to have been done well. Apparently they have given relatively little attention to the possibility of changes in the position of the supply curve. Any radical shifts in its shape or position would, of course, affect the accuracy of the findings.

The men responsible for the solution of this highly complex statistical problem have made very satisfactory progress and are to be heartily congratulated on the new light which they have thrown on the respective magnitudes of the forces affecting the location of the curve of demand for automobiles. Unfortunately, however, their work is marred somewhat by their failure to define their problem clearly and by the confused statements which they make concerning this problem. For example, a surprising degree of inaccuracy is shown in the following statements made on page 24 where they say:

> When attention was first directed toward demand phenomena many decades ago, demand was usually considered in relation to price alone. Other factors were neglected as unimportant or taken to be of a long-term, non-cyclical character, like population. The demand schedule and the demand curve were written: Demand = function of price. Or demand was plotted as ordinate in a graph, and price as abscissa. . . .

> An early study of demand was tacitly assumed to be a study of "the" demand curve or of "the" elasticity of demand. In the first statistical studies, which were confined to agricultural commodities such as wheat, corn, cotton, sugar and oats, price was the principal independent variable and satisfactory results were obtained. . . . But the notion is entirely inadequate for consideration of durable goods.
>
> Price is only one of many determining factors. Once regarded as the sole variable proper to a demand study, price need not, as a matter of fact, appear at all in the demand formula.

As previously stated, the sentences just quoted seem to reveal undue carelessness either in expression or thought. Among apparently erroneous implications in these statements, the following may be mentioned:

1. They cite prices as being customarily plotted as abscissae although in reality, they are usually plotted as ordinates. This is, of course, a trivial error but it seems to indicate lack of familiarity with customary economic procedure.
2. They state that, in the past, demand was considered in relation to price alone. Since the demand curve is designed solely to show for for a given time and place how many units of a good would be taken from the market at various prices, its sole function is to portray the relationship existing between quantities sought by prospective buyers and price. To assume that it can or ought to portray some other relationship indicates an apparent misunderstanding of its nature.

   Perhaps what Roos and von Szeliski intend to imply is that economists in the past did not realize that other forces lay behind demand. If this is the implication, nothing could be further from the truth. For generations, economists have realized that market demand schedules are made up of individual demand schedules, and that the latter are affected by all forces that affect either human wants or ability to buy. Obviously, the demand curve, being plotted in but two dimensions, is intended to show nothing more than the relationship between the two variables, quantity and price. This is its sole purpose. Yet, in the face of this fact we read on page 25 that "price need not, as a matter of fact, appear at all in the demand formula." Here we clearly have Hamlet without the melancholy Dane!

   Perhaps, however, what Roos and von Szeliski really intend to bring out is that earlier economists did not recognize the fact that the position of the demand curve does not remain fixed. As a

matter of fact, competent economists of the last generation did understand this fully but they had no statistical means of measuring either shifts in its position or changes in its shape.

3. By introducing the phrase "of a long-term, non-cyclical character," Roos and von Szeliski seem to imply that demand schedules and curves include a time factor. Clearly this is impossible. An ordinary demand curve can do no more than to show the situation prevailing at one instant of time. In practice, most demand curves are changing their shapes and positions from minute to minute. However, the statistician can procure no data showing the shapes of these curves at various times. As S. L. Horner says on page 7 of *The Dynamics of Automobile Demand*, "Sales in a given year, of course, represent a point at the intersection of a demand curve and a supply curve, at the quoted price, but they constitute the only quantitative measure of demand which is available."
4. *Methods of determining* the shape of the demand curve are confused with the *nature* of the demand curve. Roos and von Szeliski seem to feel that they have devised a new method of procedure merely because the factors which they have been called upon to eliminate are different from the factors affecting the demand for agricultural products. The fact remains that while the processes of estimating the shapes of the curves representing the respective demands for corn and automobiles are somewhat different, the curves when once found are identical in nature.

As previously stated, the above instances of inaccurate statements mar what otherwise has the earmarks of being a scholarly piece of work. Just Why Roos and von Szeliski went out of their way to set up a series of straw economists and statisticians and knock them down is something of a mystery, for like their predecessors in this field of inquiry they appear to be trying to determine the approximate shape of the typical or modal demand curve. Furthermore, while their mathematical devices for eliminating the effects of variability in extraneous influences doubtless show much originality, their general method of procedure appears to follow customary lines. Just as in the case of earlier students of the nature of demand curves, their primary goal seems to have been the determination of the typical or normal degree of elasticity existing in the demand for automobiles.

On page 25, they define the measure or coefficient of elasticity as being "the percentage change in the amount demanded corresponding to a one per cent change in the factor. Thus a price elasticity of 1.5 means that a 1 per cent drop in price will increase sales by 1.5 per cent."

As they point out, no demand curve except a hyperbola can have a constant coefficient of elasticity in all of its segments. They state that it is, however, common to assume that demand curves are hyperbolic in shape. Presumably, in many cases, this assumption may be far from the truth.

Because of inadequacy of the available data, and also because of the fact that automobile prices have been administered and hence have "not had very many or very large swings during the period under investigation," Roos and von Szeliski have been unable to determine with any approach to precision the shape of the typical curve representing the demand for automobiles. This fact they freely admit. However, on page 90, they state that such evidence as exists indicates "a price curve of elasticity somewhere between .65 and 2.5." They continue: "If one figure is to be chosen . . . , perhaps 1.5 is the best. Such a figure is broadly confirmed by the experience of Canada; a Canadian tariff of approximately one-third has been accompanied by a per capita car population of one-half that of the United States."

From what has just been said, it is clear that the General Motors investigators have no great faith in the accuracy of their estimates of the coefficient of elasticity for automobile prices. Yet the size of the coefficient may well be of fundamental importance in determining what is the correct price policy to be followed by the automobile industry, for the degree to which price manipulation might be made an effective device for stabilizing automobile sales depends, of course, upon the slope of the demand curve. If the coefficient of elasticity is only 0.65, it would require a price decline of something like 75 per cent to offset forces which would result in a 50 per cent decline in sales, if prices remained fixed. Since, under present circumstances, a 50 per cent decline in sales is not unusual, it is clear that, if the coefficient of elasticity is as low as 0.65, a policy of extreme price variability would be needed to keep constant the volume of automobile sales. On the other hand, if the coefficient should prove to be so high as 2.5, a price reduction of 20 per cent might be sufficient to offset forces which would curtail production 50 per cent if prices were kept unchanged. Although a 75 per cent price reduction would appear to be out of the question, to cut prices 20 per cent in order to achieve stability in production and employment would not seem to be an impossible program.

It is suggested by Roos and von Szeliski that, in the case of low-priced cars, a coefficient of around 1.5 may be regarded as typical. If this figure is correct, a 33 per cent price cut would be necessary to overcome the influence of forces tending to depress sales 50 per cent.

In practice, it would undoubtedly be difficult for the automobile producers to arrange for such a sharp price cut. The actual shape of the demand curve is then a factor of the greatest moment in determining the feasibility of any program for stabilizing the motor car industry by price manipulation.

The problem is undoubtedly complicated by the fact that the shape of the demand curve for a high priced car may not be the same as the shape of the demand curve for a low-priced car. Furthermore, each of these demand curves probably changes its shape radically with shifts in the phases of the business cycle. In addition, the relative slope of the demand curve probably is not uniform in all of its segments.

Even so, certain information exists which seems to indicate that the tentative estimates made by Roos and von Szeliski concerning the elasticity of the demand for motor cars are rather wide of the mark. For example, the *Statistical Abstract of the United States* shows for various years, by broad price classes, the production of cars in the United States and Canada. It may not be far from the truth to assume that the average price of cars in the "$2,000–$3,000" class is not far from three times the average price of cars in the "Under $1,000" class. Reference to the *Statistical Abstract* shows that, in a boom year, like 1929, the volume of sales in the former class was but 1/30 of that in the latter. Even if we add sales in the "Over $3,000" class to those in the "$2,000–$3,000" class the ratio still remains around 1 to 25. If trebling the price cut sales to 1/25 of the former volume, it appears that the coefficient of elasticity in 1929 was nearer to 8 than to 1.5. In 1932, a year of deep depression, the ratio of sales of cars worth more than $2,000 to sales of cars worth less than $1,000 was less than 1 to 50. This figure would indicate a coefficient of nearer 17 than 1.5. For the prosperous year of 1936, the sales ratio was 1 to 648, indicating a coefficient of over 200. In April, 1939, according to the *Annalist* of May 25, 1939, Chrevolet, Plymouth, and Ford sales combined accounted for 58.3 per cent of all new passenger car registrations in the United States, while total registrations of La Salles, Cadillacs, Lincolns, and Packards, the principal cars selling on the average at around three times the average price of the cars in the low-price range, made up but 3.3 per cent of the total. The ratio here is about 1 to 18, indicating a coefficient of elasticity of at least 6.

It is, of course, true that all the comparisons here given are rendered unfair by the fact that the quality of the cars in the higher price-class is far superior to the quality of the cars in the lower price-class. If all the available cars were of the Chrevolet or Plymouth quality, presum-

ably the numbers of persons willing to pay treble the current prices would be materially smaller than the number willing to buy finer cars at the prevailing high prices. This factor would point to a coefficient of elasticity larger than those calculated above. On the other hand, it is undoubtedly true that many persons would pay $1,500 or $2,000 for a Chrevolet if they could not purchase one for $700 to $1,000. The chances are, however, that the number who would pay the higher price if they could not buy a car for less would be relatively small. The reason for this lies in the fact that car buying is closely limited by the incomes of the would-be purchasers, and high incomes are rare as compared to low incomes. For instance, in 1936, the $1,000 to $1,500 income class contained some 11 million families as compared to the $1\frac{1}{4}$ million families having incomes of $3,000 to $4,000.

Since automobile buying is largely dominated by the incomes of the would-be buyers, it is probably true that the income status of families constitutes the best single criterion of the probable slope of the demand curve—in other words of the degree of elasticity existing in the demand for automobiles.

Roos and von Szeliski have made a real contribution in showing that automobile purchases are directly and closely correlated not with total income but with per capita "supernumerary income," in other words with "disposable income less necessitous living costs." The closeness of the relationship is shown by their Chart 28. This chart indicates that per capita income really available for automobile purchases was considerably less than half as large in 1932 as in 1929.

From the viewpoint of the prospective car purchasers, halving available income would, as regards its influence on buying a car, seem to be practically equivalent to doubling the price of cars. Passenger car sales in 1932, whether measured in terms of number or value, were reduced to less than one-fourth of the 1929 figure. This would indicate, for that year, a coefficient of elasticity in the neighborhood of 2.

Their Chart 28 also shows that per capita "supernumerary income" increased about 65 per cent between 1932 and 1937, which, in effect, would presumably approximate a 40 per cent reduction in price. Sales, however, increased 240 per cent. Here we have the coefficient of elasticity apparently approaching 6.

On page 27 of a recent National Resources Committee report entitled, *Patterns of Resource Use*, Gardiner C. Means presents a table based upon a careful statistical analysis of past records. This table shows that an increase in "consumer income" from 80 to 100 billions of constant dollars would practically double passenger-car sales. If

this income change is considered equivalent to a price reduction of 25 per cent, the data indicate that a figure in the neighborhood of 4 represents for the demand for motor cars the average coefficient of elasticity.

The evidence thus far presented here shows that the demand curve probably changes its shape markedly from time to time. It also may well be true that the slope differs materially in different segments of the curve. However, the figures indicate that the size of the coefficient probably ranges not from 0.65 to 2.5, as estimated by Roos and von Szeliski, but instead from around 2 to perhaps as high as 17, with a modal value of at least 4. If such is the case, it appears that such cyclical shifts to the left in the position of the demand curve as would normally cut automobile sales 40 to 60 per cent might ordinarily be offset by price cuts ranging from 10 to 15 per cent.

If this is true, the problem of production stabilization through moderate price adjustment seems far from being an insoluble one.

However, as Stephen M. DuBrul points out on page 134 of the General Motors study, it is clear that, if automobile production and employment are to be stabilized through price adjustment, such a program cannot be based upon a one-way policy. It must, instead, be a two-way affair. From the standpoint of social welfare it is, indeed, probably more important that prices be advanced and credit terms stiffened when production is running above normal than that prices be reduced when production is abnormally low, for price advances in boom times would tend to prevent saturation of the market and thus obviate the necessity of making sharp price cuts later. That automobile producers can be induced voluntarily to raise prices sufficiently to restrict sales materially when demand is strong seems more than doubtful. Presumably such action could be induced only by some form of governmental pressure, as for example, a tax increasing steadily in rate as the total national output of motor cars rose further and further above its trend.

In the last section of *The Dynamics of Automobile Demand*, Mr. DuBrul shows conclusively that the typical automobile manufacturer could not reduce prices materially without reducing variable costs proportionally for otherwise his enterprise would quickly become bankrupt. It is well to remember in this connection, however, that, in periods of recession, material prices usually fall sharply; hence, material costs offer practically no obstacle to price reduction. The costs which, in recent years, have proved most rigid are hourly wage rates. If price variability is to be used to stabilize production and employ-

ment, it appears then that price reductions below the normal profit-making level must ordinarily be accompanied by corresponding reductions in wage rates per hour.

Another point raised by Mr. DuBrul as well as by many other students of the problem of stabilization requires careful attention. Mr. DuBrul says that if the automobile industry adopted a definite policy of lowering prices sufficiently to keep production steady "demand would dry up completely as soon as there was the smallest sign of the condition under which prices were to be reduced, because no one would buy at all until the price cut was made. But that would create the very state of panic which in theory the policy was designed to prevent!

"Obviously no one would buy until all prices had reached zero or some pre-determined irreducible minimum."

Clearly, Mr. DuBrul's argument is ultra-important if correct. However, it is supported by no evidence. Endeavors by certain groups in recent years to stimulate buying by advancing various "administered" prices appear to have met with either complete failure or, at most, evanescent success. On the other hand, the experience of millions of manufacturers and merchants for thousands of years indicates that the way to move goods off the shelves is to reduce prices. Is there any good reason for assuming that automobiles furnish an exception to the general rule that lowering price brings more sales?

It must, however, be admitted that, on its face, Mr. DuBrul's argument is plausible. With price reductions in sight, why would not all buyers wait for further reductions? The answer lies mainly in the fact that most people are not expert mathematicians and that they cannot foresee the future. When a major decline is getting under way, even the most expert statisticians rarely are able to determine that it is anything more than a minor sag in demand. If, therefore, as soon as an automobile manufacturer found demand weakening, he cut prices 10 per cent, prospective buyers would have varying opinions as to whether prices would fall further or be raised again shortly. Some would wait, but others would rush to purchase before the price went up. Many would buy regardless of price changes, actual or prospective, for they would want cars for immediate use. All who bought cars at the 10 per cent reduction would have additional money to spend for other goods, and the spending would prevent lay-offs of workers in other fields.

The effect of price cuts in the automobile market is probably about the same as the effect of reduction of prices for women's clothing. Every thinking person knows that, at the close of a season, a merchant must clear out his entire stock of fashion goods. According to Mr. DuBrul's line of reasoning, the potential customer, understanding the

merchant's necessity, would not "buy until all prices had reached zero or some pre-determined irreducible minimum." In practice, after sizable reductions are announced, the goods are soon all sold either because customers want them immediately, or because of fear that later the goods may not be available. After price reductions, automobiles would also be bought, sometimes because they were wanted immediately, and sometimes because of fear that prices would soon rise again. The idea that price cuts cause buying to decline appears to be a new theory unsupported by evidence and contradicted by all past experience in markets for goods other than automobiles.

From what has been said above, the following conclusions appear to be justified:

1. Economists have not, as implied by Roos and von Szeliski, almost universally failed to understand that the shape and position of the curve representing the demand for a good are both affected from time to time by a multitude of forces.
2. There is no basis for assuming that the nature of the curve representing the demand for automobiles differs essentially from that of the demand curve for wheat, corn, cotton, sugar, or oats. All that is true is that the forces affecting the shapes and locations of various demand curves differ.
3. Available evidence concerning the coefficient of elasticity representing the demand for automobiles indicates the coefficient is ordinarily very much higher than the figure of 1.5 estimated therefor by Roos and von Szeliski.
4. The demand for automobiles appears to be so elastic that moderate changes in price would be adequate to offset all ordinary shifts in the position of the demand curve. Stabilization of production through price flexibility is, therefore, entirely possible provided machinery for making prices flexible can be devised.
5. To attain stability of production, it would be even more important to adjust prices upward than downward.
6. Downward adjustments in prices of automobiles would normally need to be accompanied by downward adjustments in wages.
7. The assumption that price reductions would lessen sales volume is unsupported by evidence and contrary to all experience in other markets.
8. No evidence has been adduced which disproves the general thesis that the attainment of flexibility in the field of "administered" prices would contribute greatly to the maintenance of national prosperity.

THE CONCEPT OF DEMAND AND PRICE ELASTICITY—THE DYNAMICS OF AUTOMOBILE DEMAND

By Charles F. Roos and Victor von Szeliski

"The whole subject-matter of exact science consists of pointer-readings and similar indications."—Eddington, in *The Nature of the Physical World.*

We welcome Professor King's review of our study, "Factors Influencing Automobile Demand" because criticism factually answered provides a wider dispersion of knowledge on the subject of demand. Professor King's review presents an occasion for a much-needed article on Economics and Hypothesis, which, however, we will not attempt to supply beyond offering a few observations.[1]

Since the latter half of the nineteenth century, and largely under the leadership of Poincare, and later of Einstein, the theoretical background of physical science has undergone a thorough overhauling which has ended in a shift to the point of view that concepts are to be defined, not in terms of properties, but in terms of the series of operations by which they are measured. The goal of Victorian science has been abandoned and physical scientists are now content to establish equations which describe the relations between numerical magnitudes in as simple a manner as possible, and with the widest degree of logical consistency. Bridgman says in his *Logic of Modern Physics*, p. 5, "The concept of length is therefore fixed when the operations by which length is measured are fixed: that is, the concept of length involves as much and nothing more than the set of operations by which length is determined. In general we mean by any concept, nothing more than a set of operations: the concept is synonymous with the corresponding set of operations."

No similar upheaval or shift in emphasis has taken place in economics. In modern days econometrics has contributed a little, to the extent that it has made the deductive process more rigorous, but papers have given too much attention to purely formal mathematical exercises. Aside from a few investigations by men like Evans, Fisher, Schultz, Keynes, and Robertson, little has been done regarding examination of the underlying premises of economic theory, the basic material for the deductions.

To be of practical value economic hypothesis and theory must be sufficiently precise to be capable of verification. The authors made

[1] Stephen Leacock's article, "Lost in the Jungle of Economics," in the *New York Times Magazine* for August 20th is additional evidence that the question "Economics, Where Does It Stand, and Where is It Going?", is very much alive.

hypotheses in "Factors Influencing Automobile Demand" which were capable of verification and showed the extent to which they were true. On the other hand, statements that "the demand curve shifts," or that "demand depends on other things" are so broad as to be useless. They are so broad that they are difficult to prove or disprove. Hypotheses of this type are no longer tolerated in the physical sciences. They should not be in economics. Yet the reviewer repeatedly introduces such techniques, as, for instance, when by an "other things equal" approach he arrives at an elasticity figure of 8 and uses this result to cast doubt upon our finding of about 1.5. This same approach is the basis for the reviewer's discussion of the nature of demand.

Professor King complains that we were ignorant that "for generations, economists have realized that market demand schedules are made up of individual demand schedules, and that the latter are affected by all forces that affect either human wants or ability to buy." This affords an opportunity to distinguish between surmise, hypothesis, and law. Our task was to develop a law. A surmise is always only a surmise. When it is stated clearly enough to be capable of verification or disproof, it is a hypothesis. When a hypothesis is made concrete in a particular equation, and verified statistically, it is a law. Doubtless some natural philosophers surmised, before Boyle's time, that there was a connection between the pressure and the volume of a gas; doubtless some even ventured the qualitative statement that the greater the pressure, the smaller the volume. But textbooks and histories of physics are usually silent about the earlier surmises, and confine themselves to discussions based on actual observations. Boyle developed the hypothesis $pv=k$ and tested it within certain limits of the variables. Van der Waals refined the hypothesis to bring it into logical conformity with the kinetic gas theory, and derived a new law $(V^2P+b)(V-a)=V^2K$. Surmises that "the position of the demand curve depends on a multiplicity of factors," are not demand studies.

GENERAL DEMAND FUNCTIONS

"The business of economic science is to discover the routine in economic affairs. . . . The seal of the true science is the confirmation of the forecasts; its value is measured by the control it enables us to exercise over ourselves and our environment"—Henry Ludwell Moore.

For the modern functional treatment of demand we can do no better than refer to the comprehensive work, "Theory and Measurement of Demand," by Henry Schultz who spent ten years studying the problem under a grant of the Social Science Research Council. In recognizing the need for a more general theory, Professor Schultz wrote:

The law of demand of the mathematical school

$$D=f(p_1, p_2, \cdots, p_n)$$

includes the Cournot-Marshall law of demand,

$$D=f(p)$$

as a special case. To obtain the latter from the former we make use of the only valid non-experimental method for keeping the "other things" constant which may be stated as follows: First, take all the factors (variables) into consideration; second, assign constant values to all variables except the price and the quantity of the commodity in question. This means that we must determine the equation connecting the quantity demanded and all the prices "and all other important other variables" and then assign constant values to all the variables except the two under consideration.[2]

The designation of the ordinary demand curve as a special case of the general demand function, from which it is derived by assigning constant values to all the variables except the price and quantity under consideration, marks a distinct improvement over the classical and neo-classical conception of this curve.[3] The neo-classical economists, though they talked about other variables, never took the pains to first introduce them into their demand equation and then to assign them constant values. These economists never thought to raise the question whether it was always possible to keep other things constant, nor did they ever face the problem of the levels at which each of the "other things" might be kept constant. Theirs was the *ceteris paribus* postulate of classical fame, which must not be confused with the method of mathematical ignoration described above.[4]

In November 1927, C. F. Roos first discussed the new concept of demand[5] which Schultz immediately reviewed[6] and later developed. In his first review Schultz said,

C. F. Roos, National Research Fellow in Mathematics, introduces into his demand and cost functions not only the quantities produced and the prices paid, but also the time element, and the rates of change of production, prices, with respect to time; and he discusses the phenomena of competition, monopoly and cooperation, for these general functions. By introducing the rate-of-change concept he has made his problem one in economic dynamics, not in economic statics. . . . The mathematical theory of

[2] As we stated it in the *Dynamics* article, page 90. " . . . the first task was necessarily that of solving the multi-factor problem of total demand, that is, to derive a satisfactory demand function for passenger cars. The effect of price should then be determined from this as a by-product."

[3] For early uses, of the method recommended by Schultz, see Roos' *Dynamic Economics*, 1934, Chapters 2, 3 and 6.

[4] See also F. Y. Edgeworth, "Demand Curves" in the Palgraves *Dictionary*, pp. 543–544.

[5] C. F. Roos, "A Dynamical Theory of Economics," *Journal of Political Economy*, 1927, pp. 632–656. This paper was an extension of an earlier paper, "A Mathematical Theory of Competition," *American Journal of Mathematics*, 1925, where Roos followed the lead of G. C. Evans in introducing time, t, implicitly in the demand function.

[6] Henry Schultz, "Mathematical Economics and the Quantitative Method," *Journal of Political Economy*, vol. 35, October, 1927.

economics has recently been changed from a static to a dynamic theory, and has been stated in a form admitting of quantitive application. It therefore is both a challenge and an invitation to all economists to verify it or to improve upon it.

In his later theory, Schultz maintains that the law of demand must contain a parameter t:

To obtain the probable form of the demand function, we must have numerous observations; and, in order to obtain the requisite number of observations, data covering a considerable period must, as a rule, be used. During the interval, however, important dynamic changes take place in the market. The pragmatic approach must, therefore, deal with variables (situations) which are functions of *time*. Our law of demand then becomes (1.4)

$$D = F(p_1, p_2, \cdots, p_n, t)$$

where the p's have the same meaning as in (1.3) and t stands for the time —a catch-all for those factors which change slowly and smoothly with time. If in this dynamic law of demand, we give t a fixed value t_0, representing the particular date in which we happen to be interested, we obtain the Walrasian statical law of demand (1.3) as a special case. If we also give constant values to all the p's except p_1, we obtain the Cournot-Marshall statical law of demand as another special case. In any inductive investigation, however, the statical laws of demand may only be approached, never realized.[7]

Such an approach allows for shifts in the position of "the" demand curve (in the static sense) as well as changes in shape, for the demand function

$$D = F(p, t)$$

contains a parameter, t, time; that is, in the mathematicians' language, $F(p, t)$ is an infinite family of curves.

This describes the general process and logic developed by us, and carried out in our study of residential building[8] and in the *Dynamics* report. An important difference in the automobile study is that the actual population and car stock factors for which t serves as proxy in the usual type of time-trend analysis were inserted in the equation in place of t. We did not, as claimed by Professor King in his paragraph 6, "first measure the respective intensities of these external influences and then . . . eliminate as completely as possible the effects of variations in these influences." We determined several dynamic demand functions in which the "external" influences are included on a level

[7] Schultz, *Theory and Measurement of Demand*, p. 10.
[8] C. F. Roos, *Dynamic Economics*, 1934, Chapter VI.

with price, and then, by partial differentiation, examined the relation of sales to price under various conditions. Each demand function thus obtained is a family of curves, not *the* curve.

Time trends are unobjectionable when they represent slowly changing non-cyclical factors such as population, but cannot be looked upon as effective substitutes for factors containing a large cyclical element.

We take the opportunity of repeating our belief that the use of a parameter t is in general but a sorry makeshift. The analysis ought to include explicitly as many of the major variables affecting the estimand[9] as possible. If data on the particular variable cannot be obtained, then it may be possible to introduce another variable[10] as proxy for the missing factor. This is what Sewall Wright did in his study of *Corn and Hog Correlations* (U. S. Department of Agriculture Bulletin No. 1300). In developing an equation for pork production he used hog weights during the preceding one and two years as substitute for nonexistent data on breeding.

In his paragraph 7, Professor King says, "Their work is marred somewhat by their failure to define their problem clearly and by the confused statements which they make concerning this problem." Econometrists will find sufficient definition to repeat the experiment. Professor King has given what should be regarded by the classical or neo-classical school as an excellent presentation of their point of view. The salient differences between this point of view and ours have been pointed out in our introductory remarks to this article and in our quotation from Schultz. We did not imply in our automobile study as our reviewer suggests, "that economists in the past did not realize that other forces lay behind demand." We meant what we said in our report without qualification and suggest that those wishing to pursue the matter further read that report.

Some of the difference between Professor King and ourselves will vanish if it is recalled that our study is primarily a study of demand—why automobile sales are what they are—whereas he insists that our statements about demand should refer to the demand schedule. Our problem is stated as follows (*Dynamics* p. 25), "To determine a law or formula employing the more important variables affecting automobile sales" . . . "a demand function is any formula or rule, mathematical or non-mathematical, which connects the amount of a commodity taken by consumers with the factors which determine it." This is also

[9] Statistics needs a term like estimand to replace the lengthy phrase *independent variable*. The word *criterion* is sometimes used, but the connotations of norm and standard of judgment render it undesirable for use in statistics.

[10] See Horst Mendershausen, "Clearing Variates," this JOURNAL, 34 (1939), 93.

the stand of the *Patterns* report,[11] from which Professor King quotes. Our purpose was, however, to go farther than the *Patterns* report and, by making the analysis as complete as possible, to get laws of sales that would express causal relationships, including causal effect of price on sales. Note the distinction between covariation and causal relationships emphasized on pages 86–87 of *Dynamics*.

The understanding on which we proceeded is that the demand for a product may be said to be "explained" (and the demand problem "solved") when a relationship has been obtained connecting the quantities of a commodity sold with measures of a factor or factors at least formally independent of the quantities sold. This requirement is less exacting than that for an explanation in the natural sciences where, according to Professor Bridgman, "the essence of an explanation consists in reducing a situation to elements with which we are so familiar that we accept them as a matter of course, and our curiosity rests."[12] Few of the elements or concepts which economists are attempting to fit together into satisfactory working theories are accepted by many "as a matter of course." In the present state of the science it had better be said that the elements of explanation are simply factors which challenge us to further research, and if "our curiosity rests" it is more apt to be on account of a printer's deadline than because of a feeling of complete mental satisfaction. As further research is completed, many parts of the structure of value theory will doubtless be torn down and rebuilt in new form with new building materials and new types of interconnecting members.

The demand schedule is largely a concept based on introspection; demand curves and demand functions are laws of numerical character derived by applying certain arithmetical operations to certain observations. The two have much in common, but are not identical.

PRICE IN DEMAND FUNCTIONS

It is unfortunate that our reviewer has never thought through the concept of zero price elasticity sufficiently to be able to write a demand formula in which the price elasticity is zero. Those who have, know that there is no valid reason for disagreeing with our statement, "price need not, as a matter of fact appear at all in the demand formula."

[11] *Patterns of Resource Use*, published by the National Resources Committee, Washington, D. C. "It should be noted that the objective of this study is not to determine the 'effect' of price and other factors on demand, but simply to be able to calculate the demand from a combination of these factors . . . Even where the elasticity is moderate or large, it is not always necessary to take explicit account of price" (p. 81).

[12] Bridgman, *Logic of Modern Physics*, page 37.

Professor King will find in *Patterns of Resource Use*, any number of demand formulas which do not explicitly contain price. See, for example, in this report

Telephone Consumption, page 96
Electric power consumption, page 97
Demand for Freight Service, page 99
Butter, Cheese, etc., page 101
Flour milling—consumption, page 103
Woolen and Worsted Goods, page 110

Also the automobile figures on page 27 of the *Patterns* report, to which Professor King refers, was based on a formula (page 132) which omits price. This formula we referred to as a time trend study without giving the reference because the *Patterns* report had not yet been published. As such we showed its shortcomings. We agree, however, with the following quotation from the *Patterns* report (page 8) which is also to the point that demand functions need not contain price:

> . . . it is necessary to clear away certain misleading ideas about the role of price. It is customary to consider variation in consumption as largely dominated by price and to expect that price variations must play a significant role in accounting for actual variations in consumption. While this appears to be true for most agicultural products and for some other products, it does not appear to be true for the bulk of industrial products in the post-war period.

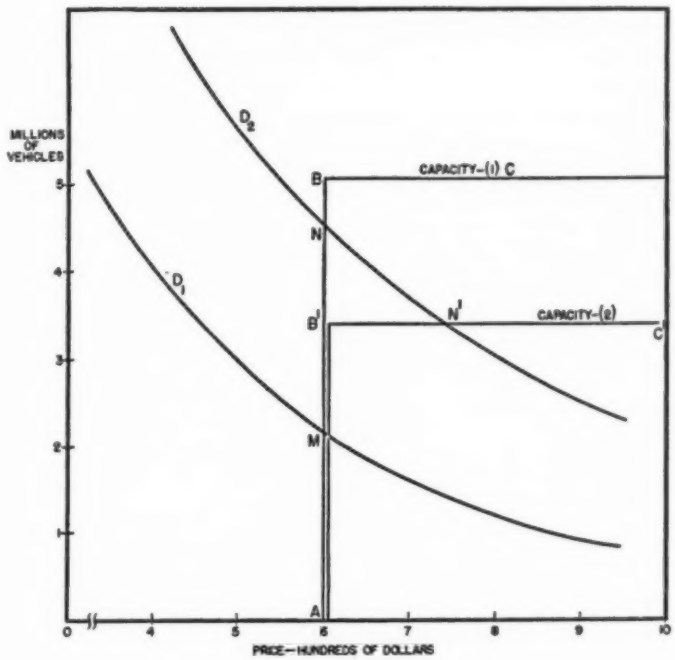
THE SUPPLY CURVE FOR AUTOMOBILES

In the course of our automobile analysis we did study the supply curve, but did not think it necessary to bring up the topic in the demand study. Since Professor King has raised the point (his paragraph 6), however, it may be said that the supply curve for one year is found to depend in large part on wages, material costs, and other conditions in the preceding year.

"The" supply curve for automobiles (in ultra-simplified form) has the shape of an inverted L over the short periods. See Chart 1. The portion AB of the curve is a vertical line; the company will sell any number of cars at the list price up to "capacity." Demand curves D_2 and D_1 represent high and low demand conditions. Ordinarily, capacity is high relative to demand, so that demand and supply intersections are on the vertical portion of the curve, say between M and N. Occasionally (as in 1927) capacity is low relative to demand, and the intersection would be on the horizontal branch $B'C'$, say at N', were it not for the fixed list price. Thus actual sales fall short of the amount called for by the demand curve by the amount $B'N$.

Professor King says of the supply curve, "Any radical shifts in its shape or position would, of course, affect the accuracy of the findings" about the demand curve. He might better have said, unless the supply curve shifts, it is impossible to determine the demand curve at all![13]

CHART 1
AUTOMOBILE SUPPLY CURVES
(SCHEMATIC)



EARLIER ANALYSES OF DEMAND

First, with respect to his questioning of our statement, "The demand schedule and the demand curve were written: Demand = function of price. Or demand was plotted as ordinate in a graph and price as abscissa," we should like to state the facts. They are:

Cournot, Walras, Pareto, and most other mathematical economists make the price of the commodity (or the system of price considered) the independent variable in the demand equation. This practice is convenient in the treatment of general equilibrium, and it has the merit of suggesting that, to the individual purchaser, price fluctuations are independent of

[13] By statistical methods, that is. If we are willing to take as true that the unknown demand curve has a particular functional form, such as $y = Ap^{-\alpha}I^{\beta}$, it is possible to determine "the" demand curve even though the supply curve remains fixed.

> any action that he can take. . . . However, Marshall and most English and American economists do not follow this practice. They make the quantity the independent variable in the demand equation. For the purpose of this exposition we shall follow the practice initiated by Cournot.[14]

Should not practice in this respect depend largely on what an author is interested in? If his subject is demand, it is natural to measure demand along the y-axis; if he is interested in the determination of price by the law of supply and demand, it is natural to measure price along the y-axis and quantities along the x-axis.

THE ELASTICITY OF DEMAND FOR AUTOMOBILES

Professor King questions an elasticity for automobile sales of 1.5 or a range between .65 and 2.5 and implies that we had no faith in the findings. The careful reader of our automobile study will find the matter amply covered in our discussion of the statistical problems involved when several *independent* variables are correlated.[15] The text will show that the figure 1.5 was an average of the range. It also was reached after a careful elimination of the effect of operating costs, which are also a part of the price that the consumer must pay. Thus, for price of the new car alone, i.e., independent of operating expenses, the elasticity yielded by the statistics is about 1.5, when price is taken as the price of the lowest price car freely available in volume. If some other price index is used a slightly different elasticity is obtained. Moreover, we presented tables on pages 92 and 94 showing how our estimate of the elasticity has varied from year to year as conditions have changed.

Before going farther, it is pertinent to ask, what is the coefficient of elasticity of demand? Suppose that ideal experimental conditions were set up in which income and all other "external" factors could be kept rigorously constant, and only price and sales varied.

A few examples showing the problems involved are: (1) The experimenter increases prices 1 per cent and keeps the new price for a long time. Sales are originally 100 and after the price change are observed to be 103, 101, 100.5, 100.5, 100.5, . . . in succeeding time intervals. What is the elasticity? Is it, for instance, $103-100=3$ or $100.5-100=.5$?

(2) With the same price conditions, sales after the price change are observed to be 110, 99, 97, 98, 100, 101, 101, . . . ? Then what is the elasticity?

[14] Schultz, *op. cit.*, p. 8, footnote.

[15] See also C. F. Roos, "A general invariant criterion of fit for lines and planes where all variates are subject to error," *Metron*, 1937, pp. 1–20.

(3) The experimenter raises prices $100 above "list" during the even months of the year, sells automobiles at "list" during the other months. Prices therefore run $700, $800, $700, $800, etc. Seasonally adjusted sales are observed to be 150, 20, 198, 8, 220, 2, 200, 2, 198, 2, 198, 2, 198, . . . What is the elasticity? The point is that consumption necessarily takes place over a period of time and hence the static concept of elasticity as developed by the neo-classicists is inadequate without definition of the length and position of the time interval. We selected a model year as the proper unit.

These examples show that even with all "external" forces absolutely constant under ideal conditions, it might nevertheless be difficult to find "the" coefficient of elasticity of demand. It is necessary to insist that current concepts may not be adequate to describing "the routine in economic affairs."

Professor King feels that automobile demand "ought" to be more elastic than 1.5 or even 2.5 in relation to price. The main reason why it is not, is that new car price is only one of the many costs that must be met in buying and using a car. The authors are perfectly willing to admit that if new car prices were dropped 10 per cent, *and* also prices of gasoline, *and* tires, *and* labor charges for repairs, *and* license fees, *and* garage rent (in New York City not a few car owners must pay out more for garage rent over a period of years than for new cars), *and* oil, etc., *and* if national income were maintained at the same level, car sales might rise 60 per cent. But that is not the question! The problem is, what is the effect on sales of a change in price of new cars *alone*. We made this point clear in the text and endeavored to answer the question on pages 92–94 of *Dynamics*.

Passing over the matter of length of time interval, evidence consistent with our findings is to be found in the sales experience of 1934. In that year Chevrolet and Plymouth raised their prices in April but Ford did not; the first two companies lost volume and in June they dropped prices and regained most of their volume. Studies of these shifts indicate price flexibilities, not elasticities, but as flexibilities are ordinarily higher than elasticities, the experience indicates a rough upper limit for elasticity.

Table I shows registrations of the three principal low-priced cars for each month of 1934, and the ratios of Chrevolet registrations to total and Plymouth to total. The table also shows price indexes for each make and indexes of Chrevolet, Ford, and Plymouth ratios. The record shows that Ford kept his prices virtually unchanged during 1934, but that Chrevolet and Plymouth raised prices in April. Chart 2 shows

TABLE I

"BIG THREE" PASSENGER CAR REGISTRATIONS, 1934

	Registrations (Thousands)				Share of the Market	
1934	Ford	Chevrolet	Plymouth	Total	Chevrolet	Plymouth
Jan.	25.8	7.2	9.7	42.7	18.9	22.6
Feb.	28.8	24.9	16.7	70.4	35.3	23.7
Mar.	46.2	50.8	30.9	127.9	39.7	24.2
Apr.	62.0	63.5	34.3	159.7	39.7	21.5
May	68.0	57.8	33.3	159.1	36.3	20.9
June	64.3	64.5	34.1	162.9	39.6	20.9
July	63.1	67.0	38.2	168.3	39.8	22.7
Aug.	54.4	55.6	33.2	143.2	38.8	23.2
Sept.	41.9	43.1	24.6	109.5	39.3	22.4
Oct.	38.6	38.1	22.2	99.0	38.5	22.5
Nov.	23.3	36.8	13.5	73.6	50.0	18.3
Dec.	14.1	25.7	11.9	51.7		

PRICE INDEXES

				Ratios	
	Ford	Chevrolet	Plymouth	Ch/Ford	Ply/Ford
Jan.	100	100	100	1.00	1.00
Feb.	100	100	100	1.00	1.00
Mar.	100	100	100	1.00	1.00
Apr.	100	104.5	105.7	1.045	1.057
May	100	104.5	105.7	1.045	1.057
June	99.1	99.4	102.1	1.003	1.03
July	99.1	99.4	102.1	1.003	1.03
Aug.	99.1	99.4	102.1	1.003	1.03
Sept.	99.1	99.4	102.1	1.003	1.03
Oct.	99.1	99.4	102.1	1.003	1.03

The price indexes are based on list prices. The Ford index includes the de luxe 5 passenger-4 door sedan with a weight of 1 and the standard with a weight of 4. The Chevrolet index includes the master with a weight of 4 and the standard coach with a weight of 1. The Plymouth index is made from the de luxe 6, the 6, and the standard 6 (coach) with weights of 1, 2 and 2 respectively during January–May; thereafter with weights 1, 1 and 2, plus the special 6 weighted 1. As the prices are all highly correlated similar indexes would be obtained even with widely differing weights.

Chevrolet's and Plymouth's shares of the Big Three market plotted against prices relative to Ford. Regression lines have been drawn to show the connection between the two quantities. As the scatter is wide, it is possible to draw other lines—the reader may make his choice within limits. The lines as drawn will give the maximum elasticities; least squares fitting would give lines with smaller slopes and hence lower elasticities. The results giving maximum elasticities are:

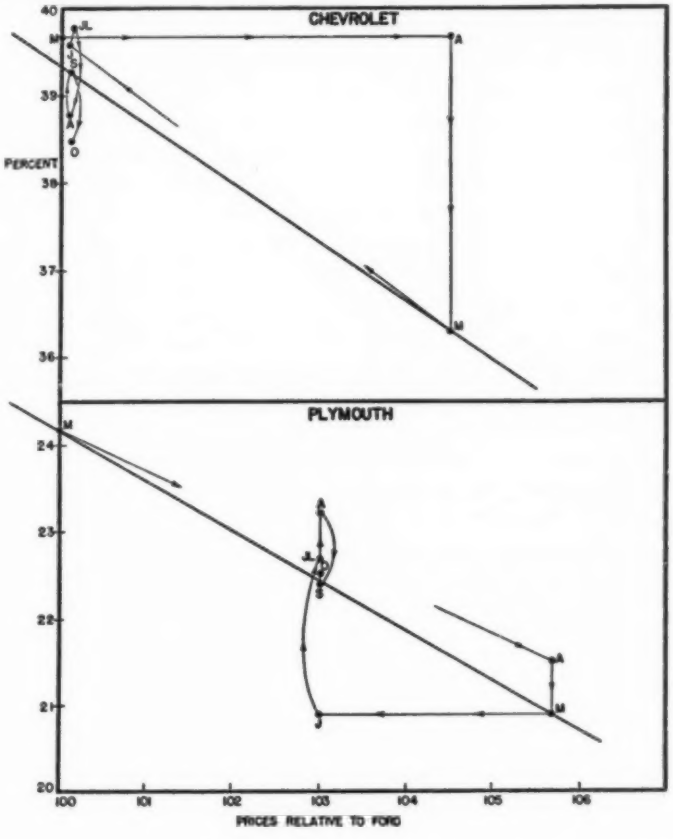
Chevrolet		*Plymouth*	
Relative Price Index	Per Cent of Big Three Market	Relative Price Index	Per Cent of Big Three Market
100	39.4	100	24.2
105	35.9	105	21.3

In the case of Chrevolet, increasing the relative price 5 per cent decreased sales by 3.5 points or 8.9 per cent. This shows a flexibility in the neighborhood of 1.8 to 1. In the case of Plymouth, increasing the relative price 5 per cent decreased the sales percentage by 2.9 points or 12 per cent; flexibility here is in the neighborhood of 2.4 to 1.

The purpose of using market percentages instead of sales is to avoid the problem of correcting for seasonal variation. The dots for January, February, November, and December have been omitted from the chart because these months were too much affected by model changeovers.

CHART 2

EFFECT OF RELATIVE PRICES ON SHARE OF BIG THREE MARKET, 1934



In an attempt to arrive at a true figure for the elasticity of demand for automobiles we observed all the safeguards of modern statistical analysis and after exhaustive study involving various price measures, arrived at a figure of about 1.5.

Professor King in his approach says: "In a boom year, like 1929, the volume of sales in the former class ($2,000–$3,000) was but 1/30 of that in the latter (under $1,000). Even if we add sales in the 'Over $3,000 class' to those in the $2,000–$3,000 class the ratio still remains

around 1 to 25. If trebling the price cut sales to 1/25 of the former volume, it appears that the coefficient of elasticity in 1929 was nearer to 8 than to 1.5."

What Professor King has measured is not elasticity at all, but rather the consumers' opinion of what the extra luxury of the higher priced cars is worth. Clearly if both sets of products had been identical there would have been no sales in the $2,000–$3,000 class. In such event Professor King, following his method, would have had to proclaim an *infinite* price elasticity.[16] Such a result and similar untenable results that Professor King obtains by studying our findings on supernumerary income show the need for clear definition, and for hypotheses sufficiently precise and complete to be verifiable by operations.

A REJOINDER

The reply of Roos and von Szeliski to my criticisms draws the issue clearly. I consider that statistical and mathematical processes can, by themselves, but rarely be relied upon to establish economic laws or relationships, and that when findings are based purely upon the results of such procedures they are even more likely to be invalid than when they are based solely upon deductions drawn from every day observations. My experience indicates that, in the economic field, statistics and mathematics are mainly useful for verifying and reducing to quantitative terms concepts which have first been worked out thoroughly by a process of deduction from facts commonly observed. They, on the other hand, believe in relying almost entirely upon the inductive method.

As I see it, the conclusions of orthodox economists concerning the nature of the composite demand schedule are not "surmises" but certainties. The task of the statistician is not to develop a new concept but to approximate as accurately as possible the shape of the demand curve at an instant of time, or, if this task is beyond his powers, to estimate the probable mode of the shapes of the series of demand curves existing between two dates. After reading several times the reply of Roos and von Szeliski, I fail to discover that either their research or that of the authorities cited has added anything to the concept stated above. The mathematical method of determining the so-called "dynamic law of demand" appears to be merely a convenient device for dodging the fact that the demand curve does change its position and shape, and arriving at an answer which is delightfully definite, though it may be meaningless and perhaps useless for practical purposes.

[16] The following data enable the calculation of elasticity of demand for wool by Professor King's method:

Grade of Wool	*Consumption in 1938*	*Price in 1938*
64s70s80s	248,500,000 lbs.	70.4 cents
56s	102,900,000 lbs.	58.9 cents

The coefficient of elasticity is found to be *minus* 3.56.

Despite involved formulae and discussions of the "demand function," what Roos and von Szeliski finally arrive at is a statement concerning the demand for automobiles very similar in nature to that set forth centuries ago by Gregory King concerning the demand for "corn." They deem it probable that a price cut of two per cent will increase automobile sales somewhere around three per cent, and they derive therefrom a coefficient of elasticity of demand for motor cars. They assume that the smallness of this coefficient is due to the fact that, when buying an automobile, the purchaser takes into account the costs of tires, oil, gasoline, license fees, repair costs, and garage rent. What weight he actually gives to these factors is problematical.

It must be admitted that relative sales volumes of cars in various price classes are dependent upon numerous other factors as well as upon the shape of the demand curve. All that I meant to indicate was that the last mentioned factor is probably very important. I wonder whether Roos and von Szeliski really believe that, other things being equal, doubling the price of all passenger cars on the market would, in the long run, cut new car sales by no more than 67 per cent. The evidence which I cited seems to me to cast decided doubt upon the validity of such a conclusion.

WILLFORD I. KING

New York University

A FURTHER REPLY

The reader now has the situation before him. Professor King's final reply invites the following concluding comments:

(1) The method of deduction alone is absolutely powerless to reveal the market demand schedule or the demand function for any commodity. It throws no light whatever on whether the slope of the automobile demand curve is .5, 1.5, or 25. So far is this true that some of the theoretical economists despaired of ever establishing or constructing any specific demand schedules. See, for example, Edgeworth's remarks in Palgrave's *Dictionary of Political Economy*, Volume I, p. 534.

(2) Actual demand scheules can only be found by analysis of statistics. The issue here is *how* they shall be analyzed, and above all how the method of analysis can be related to the theoretical background or what kind of techniques are required by the theoretical background.

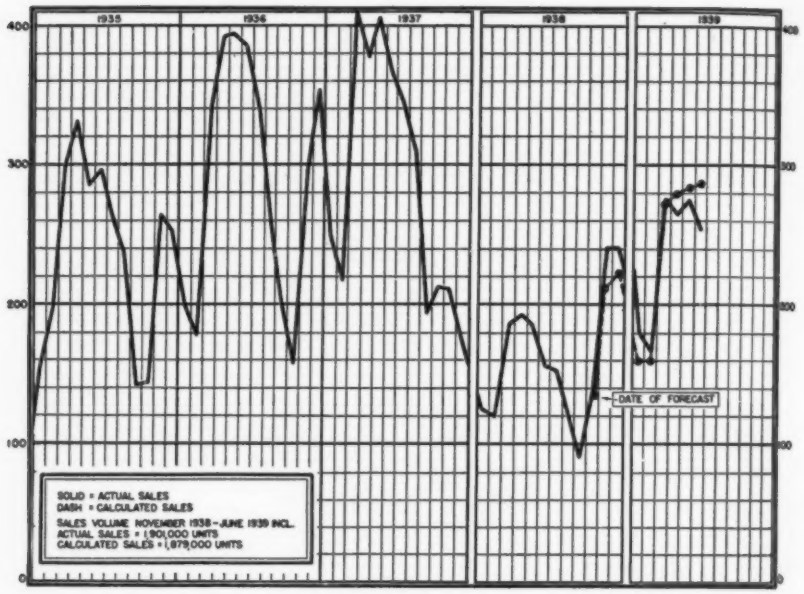
(3) We do not rely almost entirely on induction and, contrary to Professor King's statement, we regard every-day observations pertaining to the industry as of the utmost importance. The reader of *The Dynamics* will, we believe, discover that it is saturated with this premise.

(4) While it was not our intention to bring up the question of forecasting, Professor King's concluding paragraph suggests that how forecasts work out has some bearing on the question. Chart III shows an actual forecast for automobile sales made in October, 1938, by methods based on the assump-

tion that the elasticity is $-.73$. Actual sales in the eight months ending June, 1939 were 1,902,000 units, compared to the forecast of 1,879,000. While this equation, which incorporates price with an exponent of $-.73$, gives satis-

CHART 3

PASSENGER CARS—DOMESTIC RETAIL SALES



factory results, we believe the most probable value is higher, viz., 1.5. On the other hand, as stated in *The Dynamics*, it is possible that the coefficient is as high as 2.5.

(5) Finally, as we have explained, the evidence which Professor King cites is invalid, and has no relationship whatever to the concept of elasticity as developed by Cournot, Jevons, Edgeworth, Marshall and other writers.

CHARLES F. ROOS
VICTOR VON SZELISKI

THE 1939 CENSUS OF BUSINESS GETS UNDER WAY

By Fred A. Gosnell
Chief Statistician, Census of Business

Plans are rapidly being perfected for starting early in January the field canvass of the 1939 Census of Business, a part of the Sixteenth Decennial Census. All questionnaire forms have been printed, field instructions have been prepared, and the area managers, approximately 100 in number, have completed their course of training in Washington. These area managers are now in their respective districts instructing supervisors and enumerators preparatory to the actual enumeration. From a standpoint of planning the work and organizing and instructing the field force, we are about a month in advance of any previous census.

Three Censuses of Business have been taken covering the years 1935, 1933 (called the Census of American Business), and 1929 (known as the Census of Distribution). A comparative summary of the subjects or fields covered in these Censuses is presented below.

SUBJECTS COVERED IN BUSINESS CENSUSES

1939	1935*	1933	1929
Retail trade	Retail trade	Retail trade	Retail trade
Wholesale trade	Wholesale trade	Wholesale trade	Wholesale trade
Service businesses	Service businesses	Service businesses	—
Places of amusement	Places of amusement	Places of amusement	—
Hotels	Hotels	Hotels	Hotels
Contract construction	Contract construction	—	Contract construction
Sales finance companies	—	—	—
Power laundries and dry cleaning	—	—	—

* In addition to the subjects listed above, the 1935 enumeration included radio broadcasting stations, trucking for hire, bus transportation, financial institutions, insurance and real estate, and the operations of commercial and other non-residential buildings. Inquiries on power laundries and dry cleaning establishments have been included in Manufactures in previous censuses.

It will be noted that the scope of the present census is broader than in 1929 but somewhat reduced from 1935. Our experiences in 1935 convinced us that it was not possible to take a complete census of American business through a single enumeration force. Many businesses, such as insurance companies and financial institutions, are too specialized for proper consideration by enumerators trained for the most part to canvass trading establishments and service units. Others, such as trucking concerns, require a different approach as many of them do not

have established places of business recognizable as such by the enumerator in making his rounds. It is believed that complete and accurate reporting of all establishments or industries included in the current Censuses of Business and Manufactures is as much as can reasonably be expected in one enumeration.

Readers will be interested to know that the Business Census is now being taken in Alaska covering the twelve months ended September 30, 1939, and that it will be taken in Hawaii and Puerto Rico covering the current calendar year. In each case a single questionnaire somewhat restricted as to detail is used for reporting all classes of establishments. Previous business enumerations have been limited to the continental United States.

The scope of each of the subjects covered is defined, for the purposes of this census, substantially the same as in the past. Such changes as have occurred have resulted primarily from the necessity of carefully delimiting the fields and of defining more accurately the outer fringe or periphery; rather than from a change in fundamental concept. In 1933 when service and amusement businesses were enumerated for the first time, it was necessary, for example, to redefine the margin of retail trade. Information subsequently received disclosed that in 1929 we included as retailers many establishments that were in fact service businesses or places of amusement selling some goods over the counter. The inclusion or exclusion of construction industries in the census requires careful attention to the limits of both wholesale and retail trade. Fundamentally, however, the scope of each field has remained substantially the same; the shifts that have occurred being unimportant when compared with the totals for the fields covered.

Important changes, however, have been introduced in questionnaire content particularly when 1939 is compared with 1929—changes designed to emphasize important subjects or to measure new developments. Only recently have we appreciated fully the extent to which employment is provided by trading and service establishments. Including self-employment, fields covered in the current census engaged in 1935 more personnel than all of our manufacturing industries, and almost the equivalent of all manufacturing plants, mines, and quarries combined. They accounted for approximately one-fifth of our estimated total gainfully occupied for that year. Recognizing this importance, each enumeration since 1929 has placed more emphasis on employment and pay roll inquiries.

The number of employees is to be reported by months in connection with all phases of this census, and on the retail, service, and construc-

tion schedules—fields in which the information is particularly significant—part-time employees are called for separately from full-time on a monthly basis. Pay roll is to be reported for the year as a whole, with a separate figure for part-time. In addition, reporting establishments engaged in retail and wholesale trade, hotel business, and laundering and dry cleaning are asked to analyze a pay roll for a representative week and show the number and pay roll—full-time and part-time separately—by classes of employees or occupational groups. The week ended October 21, 1939, has been selected as representative for most businesses. This method of studying employment and pay rolls parallels rather closely the 1935 precedent but differs materially from 1929 when employees, with some exceptions, were reported for specified months only.

Data on receivables will be presented for the first time in connection with the current censuses of retail and wholesale trades. Accounts and notes receivable at the beginning as well as at the end of the year are called for with a separate classification for balances on installment accounts in the case of retail trade. To complete the picture of consumer debt on installment accounts, sales finance companies are also requested to report outstanding balances (consumer paper only) as of the beginning and end of 1939. Arrangements have been made to obtain similar information from banks.

Stocks of merchandise on hand for sale have in the past been reported as of the end of the year only. This time inventories are called for as of the beginning as well as the end of the year.

The growing importance of sales taxes since 1929 is recognized in the current census even more than in 1935. Sales taxes added to the wholesalers list price or the retailers marked price of the goods, taxes collected by wholesalers and retailers from their customers and paid by them direct to taxing agencies (state, county, or city), were relatively non-existent in 1929. Such taxes are to be reported separately in the current census.

Recognition is also being given to many new developments in wholesale and retail trades. A special inquiry is included in the retail schedules designed to develop information on the "self-service" grocery business. Provision is made for the segregation of consumer and farm cooperatives in order that their location and importance may be measured. Wholesale and retail units of voluntary and coöperative groups are being identified so that the growth and significance of these newer types of merchandising organizations may be studied.

An added feature which we believe will be most helpful in connec-

tion with the retail trade is our so-called "block system" of reporting sales by commodities or lines of merchandise. An effort was made in 1929 and again in 1935 to obtain such an analysis of sales through a long list of commodities on the schedule. Because of the lack of detailed records in most stores and the varied methods of accounting in others, we are convinced that satisfactory results cannot be secured from such a list. Under the present plan a single "block" is provided for a given kind of store, a block in which as many as five to twenty principal commodities commonly sold in that kind of store are to be reported separately. The remaining commodities are to be thrown into a miscellaneous "all other" classification. For example, combination stores (groceries and meats) with sales of $20,000 or more for the year 1939 are asked to report on each of the following eight lines:

Meats (all kinds), sea food, poultry
Fresh fruits and vegetables
Milk, eggs, dairy products, ice cream
Bread, bakery goods
Liquors (packaged goods)
Beer, wine (packaged)
Groceries and foods not specified above (including soft drinks, candy, nuts, canned goods, etc.)
Other sales (to be analyzed further if more than 5 per cent of total sales)

In spite of its short-comings, this plan promises to be much more successful than past attempts.

Changes are also contemplated in the plan of presenting the final results. More emphasis will be placed on trade and special studies treating in detail with one or more phases of the work. In wholesale, for example, a separate study is contemplated for each trade, a report in which all data pertaining to the subject under discussion will be assembled and analyzed. Such subjects as consumer coöperatives, "self-service" markets, merchandising groups organized on a voluntary basis, and coöperative marketing associations may be given special consideration. These trade and special studies will be in addition to, and from the standpoint of time will follow after, the more general reports.

We recognize the fact that there has not been a sufficient analysis of the data collected for the last two Censuses. In 1933 this was due to a lack of funds, and in 1935 there was not sufficient time to do this more difficult and time-consuming type of work. The tentative plans call for a considerable number of presentations that will require involved cross-tabulations of the results. An illustration of this type of information that will be presented is the number of employees by volume and kind of

business for States and at least the 16 largest cities. We also believe that much of the basic data should be presented by city-size groups. There is such a large number of special tabulations that could be made to furnish valuable material for marketing purposes that it is most difficult to sift out those of most importance. This subject is being given special consideration at this time even before the enumeration begins. The work involved in these special analyses must of course be kept within the available funds and time limitations. We should like to have suggestions pertaining to the type of tabulation and analysis that would be most valuable.

Preparations for the Business Census for 1939 have received more attention than any previous one. Beginning in March, a large number of business men representing various trades and businesses were invited to attend a series of conferences to consider the questionnaires that will be employed in the Business Census. In addition to the more than 100 business men who gave us their assistance in making preparations for the Census, a large number of representatives of Governmental agencies, research and statistical associations participated in these meetings and offered valuable suggestions. This has resulted in final schedule forms which meet the requirements of business and most of the Governmental agencies and at the same time do not contain any questions to which there is objection on the part of the business men who will be required to furnish the data for their individual establishments. These meetings have contributed very largely to the fact that we have the whole-hearted support of practically every trade association and Chamber of Commerce in the United States. Copies of the schedule forms, together with letters requesting their active coöperation, have been sent to several thousand such organizations. The large number who have responded and pledged their coöperation has been gratifying and will, I believe, result in obtaining all reports at a much earlier date than heretofore.

As I pointed out in the June, 1937, edition of this JOURNAL, the most perplexing problem that we have in connection with the Census of Business is the completion of the field work within a reasonable length of time. One of the other real problems has been the proper control of the enumeration, with particular reference to accuracy of the returns and the completeness of coverage. With these problems uppermost in our minds, the Business Census Division prepared a complete card index of all retail and wholesale trade establishments, using the 1935 reports as a basis for supplying information on the index cards that will assist the enumerators in making a proper approach to the respondents, and

insure a more complete and accurate canvass than heretofore. This will not only be of great benefit in connection with the canvass, but will, as previously pointed out, be of tremendous value in the proper control of classifications from one Census to another. This is only one of the accomplishments of the Bureau which will insure the obtaining of more accurate data and an earlier completion of the field work.

The Area Managers, to whom I referred previously, will have supervision over from five to ten District Supervisors, who will have direct charge of the enumeration of Business and Manufactures, beginning on January 2, 1940. All the Business and Manufactures Census enumeration will be directly supervised by approximately 500 District Supervisors. These District Supervisors will have charge of the work in all areas except the 22 largest cities in which the Business and Manufactures work will be controlled directly by experienced office employees. In the areas where the District Supervisors are employed, it will be the duty of the Area Manager to contact frequently (at least once or twice each week) each District Supervisor coming under his supervision. The Area Managers were sent into the field late in November for the purpose of instructing the District Supervisors on the Business and Manufactures Censuses. Approximately 8,000 enumerators will be employed and trained late in December and be ready to begin the enumeration promptly on January 2. A time limit of March 31 has been set for all cities having a population of not more than 100,000 and the rural areas. For all other cities, the time limit for the enumeration is April 30. The training of these Area Managers has been so thorough and the improvements in the technique of the field work have been so outstanding that it is confidently believed that this goal will be attained. I cannot stress too strongly the fact that a major contribution toward attaining this goal is the fine coöperation that we are receiving from trade associations, Chamber of Commerce executives, trade publications, and individual business men. It has been truly amazing to observe the unusual interest that has already been manifested.

Those familiar with past censuses know how dangerous it is to hazard a guess as to when certain phases of the work may be completed. Officials of the Bureau are ever mindful of the fact that timeliness is an important characteristic of the work—that the data are in a measure perishable—and every effort is made to keep the program moving at maximum speed. The job is a big one, however, and certain factors essential to early publication are beyond our control. We call upon some companies, for example, to submit several thousand schedules including information which must be assembled from all parts of the coun-

try. Other companies for one reason or another do not have all their year-end records completed until some time in the spring. When pressing for time, consideration must be given to the business man's problem. On the asset side of the ledger, business men have come to know the census and its value. They themselves are using the results more than ever, hence our requests are receiving more prompt attention than at any time during the past.

Considering the goodwill built up in the past censuses and the fact that our plans, instruction program, and field organization are well in advance of previous censuses, we might reasonably expect the enumeration to be completed, or nearly so, by the end of April. Numerous office problems remain to be solved with work on the Population, Housing, and Agriculture Censuses coming at the same time, but I believe we can arrange to publish the results State by State as promptly as the canvass in each area is finished. Our plan is to publish all State, county, and city reports in final form by the end of September. Early in 1941 we hope to have the general tabulations practically completed, leaving the remainder of the census period for trade reports and special analyses.

Judged in the light of past performances this program may seem ambitious but I believe it can be accomplished. It is geared to meet the demands of those having early need for the data, particularly retailers, wholesalers, and manufacturers who must have this type of information in planning their sales programs, building sales quotas for 1941, and in allocating advertising and sales effort.

Our one objective is a complete and most worth-while census in as short a time as possible.

THE PLACE OF RESEARCH IN THE LONG-TIME PLANNING OF A STATE PROGRAM FOR PUBLIC WELFARE*

By David M. Schneider
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New York State Department of Social Welfare

Probably no other area of social action has undergone such rapid and profound change in the last decade as the field of public welfare. The overwhelming experiences of the depression years forced into the discard the traditional concept that the problem of public dependency is one of individual maladjustment; that some lack in the individual is responsible for his plight. Primary responsibility for the alleviation of dependency is now quite generally recognized to be society's rather than the individual's, and a return to the laissez faire attitude toward the problems of poverty is unthinkable. Public welfare is gradually getting away from the old idea that a grudging grant of relief, barely sufficient to keep the body alive, is all that the needy person has a right to expect of society. Today our thinking tends in the direction of minimum physical and cultural requirements commensurate with our standards of human dignity.

The increasing scope of public welfare, the realization that many of the problems thought at first to be of an emergency character must be considered as permanent, and the very magnitude of these problems, have greatly stimulated interest in defining their exact nature and inquiring into their causes. Research as a mechanism for the finding and sifting of facts is becoming more and more recognized as a necessary arm of public welfare administration.

What precisely is research? Thorsten Sellin has described it as signifying "a search, by means of approved and standardized scientific methods, for relevant knowledge which may form the basis for generalizations applicable beyond the particular problems investigated. Social research implies the use of scientific methods in the study of scientific data."

It is perhaps well to draw a distinction between social research in its broad general aspects and in its more restricted application to the field of social welfare. Social research encompasses the entire social-economic environment whereas research in social welfare covers only those social problems with which organized social welfare must deal. Re-

* Paper delivered under the auspices of the Joint Committee on Relief Statistics of the American Statistical Association and the American Public Welfare Association at the National Conference of Social Work, Buffalo, June 19, 1939.

search into the whole field covered by the social sciences, vastly important as it is, must be considered very largely beyond the province of the public welfare agency. The research foundations and some of the larger universities are equipped to engage in this type of study, and certain of the federal agencies may plow the edge of this wide field at times; but the state department of public welfare must of necessity confine its research to matters closer to its immediate job.

Because of the urgent character of the work of the state agency, it is sometimes argued that research is a luxury in which such an agency cannot afford to engage. This attitude is usually the result of a misconception of the nature of scientific research, due perhaps to experience with some fruitless survey which masqueraded as research but wasn't the real article. Real research is vitally necessary to an understanding of the maladjustments with which social welfare is concerned and to a charting of our course of action with regard to these maladjustments. We need the tools of research and statistics to measure the effects of our welfare policies, to lay down policies for future action, for community planning and for legislative action.

Granted the need for research, let us examine several types of research in social welfare in which a state agency may properly and profitably engage. First there is historical research, useful as a means of linking the present with the past; noting developments of welfare activity; and as a mechanism for accumulating dynamic facts on which to base social action. Through historical research we may trace the origin of many of our problems of today and our techniques and methods of dealing with them. Research into the past reveals the hard trial-and-error route through which social progress is attained; there is no straight line of progress in public welfare. A factor that constitutes a definite step forward at the time of its establishment often becomes a barrier to further progress in a later period.

Historical research brings to light interesting cycles in methodology. For example, in Colonial times poor relief was predominantly outdoor in character; in a later period it became chiefly indoor or institutional; in our own day the cycle has swung again toward outdoor relief, though this time on a higher plane.

The study of recurring economic depression is interesting—if discouraging—in revealing the repetition in one emergency after another of the same futile round of halfway remedies and palliatives: soup kitchens, bread lines, inadequate private relief, and finally, if conditions become bad enough, a belated resort to some form of public relief. If, through historical research, the public agency becomes aware of the

failure of methods used in the past and learns what steps not to take in a new but somewhat analogous situation, such research is abundantly justified. Historical research may also reveal measures which in the past have been found effective but which have been overlooked or forgotten in later treatment of similar problems.

But how will the public agency get funds to make this type of research possible? There is no easy solution to this problem; I may, however, hazard the opinion that it can be done. Even the heart of a state budget director may now and again warm to the cause of historical research. I quote "Permit me to congratulate you upon the significant monograph you have contributed to the specific field of public welfare work as well as to the larger field of the history of the development of man's control over the problems of his own social organization. . . . I shall see that the fund of historical knowledge contained in this book is made available to the members of my staff." That from the zealous guardian of the purse strings of the State of New York on the occasion of the recent publication of the *History of Public Welfare in New York State!*

Another type of research which falls properly within the sphere of a state welfare department is the social survey. I am thinking now of the social survey as a special study of some specific phase of community life, such as the etiology of juvenile delinquency, the medical needs of the aged, the adequacy of general hospital facilities for the lower income groups, to mention a few examples. Such studies are basic to the planning of future action on the part of the state and the local communities concerned, to the revamping of old programs or the embarking upon new ones.

It may be said in passing that the more general type of social survey which aims at a rounded picture of all phases of the life of a community—the sort of thing the Lynds have done so well—is hardly within the scope of the state agency. It is difficult to envision the day when even in the larger states the research bureaus will be adequately staffed for this sort of activity.

The immediate function of the fact-gathering branch of the state department of public welfare is the collection and arrangement of statistics. The establishment of adequate series of basic statistics is the rock-bottom job of the bureau of research and statistics. That much it must do if it does nothing else. Such statistics are necessary to an understanding of current situations and also to a study of trends as a basis for prognosis, for estimates of future needs.

But even the best statistics are sterile if they are not subjected to

critical analysis and the results interpreted for the benefit of the administrators of the welfare programs. This process of analysis and interpretation is part of the primary type of research in which a state bureau should engage—administrative research. The function of statistics is to reduce information to numbers, although not all social data can be expressed in quantitative terms. Relationships must be traced between different sets of facts; figures must be compared and checked against the social situations from which they are drawn. This is the kind of research which is necessary to the day-to-day administration of the program as well as to the planning for the future on the basis of today's experience.

Suppose, for example, that there is a sudden and sizable change in a series of social statistics that cannot readily be explained by obvious factors such as administrative changes, changes in legislation, and so forth. The causes may be complex and obscure and the data themselves give no clues to these causes, but it may be imperative that they be discovered. Here research enters as a necessary adjunct of statistical work. No really constructive planning is possible without painstaking research directed to specific ends.

We have reviewed hurriedly the need of research and what may be expected from the application of the research technique, and have indicated in general the types of research in which a state department of public welfare may properly interest itself. This brings us to the problem of the organization of the fact-finding branch of the department, its relation to the department in which it works, and how it can best carry out its functions.

It has sometimes been suggested that the bureau of research and statistics in a state welfare agency be subordinated to the accounting bureau. I find myself in complete disagreement with this position. Statistics is not part of accounting—statisticians and accountants approach their problems from a different viewpoint. The records of the accounting bureau are not based on a system of reporting designed to produce well-rounded series of social data nor to produce such information on a current basis. Very few heads of accounting bureaus have the specialized training in statistics and research which would enable them to gauge the social import of the data. If statistics and research be subordinated to accounting, the statistical records will be the stepchildren of the accounting records and research will either be abandoned entirely or receive very haphazard attention. This is no criticism of the accountant. It is merely a statement of my conviction that accountancy and statistics are two separate professions. Accountants are not trained

in research technique and accounting records are not in such form as to provide the basis for valid social judgments. Even such fiscal functions as the preparation of forecasts of public assistance expenditures can best be performed by the research staff.

The director of the research bureau should, in my opinion, be directly responsible to the administrative head of the department. If the research bureau is to be useful to the administrator, the research director must not be left to function in a vacuum. He must know what the administrator's problems are from day to day, what he is thinking about these problems, and what his particular needs may be with reference to current and long-time planning. For this reason, the research director should have access to the meetings of the administrative officers at which policies are discussed, and procedures reviewed. Such large and efficient organizations in the business world as the General Motors Corporation and the General Electric Company—to mention only two examples—found it necessary for efficient operation to place their research bureau in a position of direct responsibility to and direct contact with the executive officers.

It is highly important to create within the state welfare department an advisory committee on research, which can keep the research director in close contact with what the various bureaus may need in the way of statistical advice or special analysis on particular problems. To too many administrative heads research is a nebulous thing whose mysteries they do not exactly understand and whose value, therefore, they do not appreciate. Indeed the research bureau may not have much value to the administrator if it is permitted to remain isolated from the other divisions of the department and then is suddenly called upon from time to time to pull a statistical rabbit out of a hat or work some minor research miracle. An atmosphere of pressure and tension is not conducive to a coördinated program of research, if indeed any research worth mentioning can be done under such circumstances.

We may just as well face the reality that although the value of statistics has rather generally become accepted, research is still something of an unwanted waif in the average public welfare agency. Because it is often difficult to demonstrate in advance the value of research in relation to the immediate pressing problems of the administrator and partly—as mentioned above—because of the many inept investigations and surveys which have gone by the name of research in the past, the research bureau often has a difficult time obtaining the necessary personnel to carry out an adequate program. An advisory committee within the department, through which the heads of other bureaus are

consulted, makes these officers "accessories before the fact" in relation to the research program and hence more sympathetic to the needs of the research bureau and more tolerant of such shortcomings as it may have.

Now if research is to win its rightful recognition as an important adjunct of the administration of social welfare, the research bureau must be able to furnish the product desired when it is needed. The research director is somewhat like a small grocer whose capital is limited and who must therefore not become overstocked with old or unnecessary goods. He must have on his shelves a wide variety of products to anticipate his customers' needs, but he must not carry dead stock which cannot be moved. In terms more specific to the research bureau, this means that work sheets must be organized so as to make information available quickly and with the least possible effort in preparing special compilations; at the same time periodic appraisal should be made of the usefulness of the current data, and statistical series of doubtful value should be discontinued.

It is often advisable, in a large bureau, to divide the staff into two main sections, one to handle only the preparation of current statistics and routine reports—the other to carry out the research program. Special inquiries, since they involve some degree of analysis and interpretation, can best be cared for by the research section.

Field service on the part of a state bureau of research and statistics is needed, first, to insure uniformity of reporting by local agencies, second, to obtain first-hand information which may be needed for the state's research program, and third, to assist local agencies in their own research activities. Where funds are not adequate to the maintenance of a specialized field force to develop full-time contact with the localities, a state director should utilize such part-time service as can be had by detaching some of his staff members from their usual routine for regular periods of field duty. He may also avail himself of any part-time services obtainable through the coöperation of the staffs of regional offices, which generally include accountants and social workers. As a minimum requirement in any case, there should be one full-time position within the bureau of research and statistics devoted to the coordination and supervision of the field work.

Anticipating the needs of the administrative officers is, as we have indicated, one of the important factors in the success of a research bureau. It is not enough that the information should be on tap in the files of the research bureau. If this bureau is to be of maximum usefulness to the department, the director will, on his own initiative, feed the

officers and other bureau heads with useful information without waiting for their requests. This feeding process may take the form of memoranda at regular or irregular intervals calling attention to some item of information gleaned through the statistical reporting system or perhaps taken from the publications of other state departments or federal agencies, usually with a paragraph of interpretation as to why this material should be of interest. If such feeding is skillfully done, it will create what I like to call "the appetite for research." Naturally, when a department executive receives some unexpected bit of information which hits the mark, he comes back for more. Thus a tendency to rely upon the research bureau can be built up through these informal services and the value of the research function becomes more and more appreciated.

If a state department of public welfare is governed by a state board consisting of a number of representative citizens, it may be well to secure a small working research committee made up of the most interested members of the board. Such a committee will undoubtedly interpret the aims and the needs of the research bureau to the entire membership of the board. It can also be of great help in securing necessary appropriations for the bureau because of the prestige of these citizens in the community and because of the strategic position of the board in relation to the executive and legislative branches of the state government. It must be remembered, however, that neither the advisory committee within the department nor the committee of the state board can assist the director of the bureau in the solution of such difficult technical problems as will arise from time to time.

The experience of the Bureau of Research and Statistics of the New York State Department of Social Welfare has proven beyond doubt that an advisory committee of professional statisticians and research workers, drawn from the private as well as from the public welfare fields, can be of tremendous value in helping to solve many serious technical problems. The New York State Demonstration project for the development of uniform and comprehensive welfare statistics was undertaken in coöperation with this committee. This was an extensive project resulting in the publication of a series of handbooks designed to insure standardized reporting of statistics on five major welfare functions: foster care of children, hospital in-patient service, dispensary or out-patient service, private institutional care of the aged, and aid to dependent children. The technical skill and practical experience of the advisory committee was invaluable to our bureau in the prosecution of this task.

There is another service besides the giving of expert advice which a technical advisory committee can perform for the state bureau of research. Such a committee, because of its representative character can marshal the support of both public and private welfare agencies behind the state bureau and thus assist it in its flight for adequate staff and needed funds. As one member of the advisory committee to our own bureau has said, such a committee "may be the beginning of a bulwark to help in holding the service steady, if and when it is endangered with needless sacrifice."

Let us look for a moment at the relationship of the state agency to the Federal Social Security Board to see where that relationship can be used to further the research activities of the state departments of public welfare. Every state in the union now maintains working relations with the Board and it is highly desirable that such arrangements be established for programs outside of those in which the Board is officially concerned. It is particularly desirable, for example, that the states make their general relief data available to the Board. It is also desirable that the collection of social data on a national scale be centralized within a Federal agency such as the Social Security Board.

At the present time the Board's bureau of research and statistics does not engage in any form of extensive research, on a state or local level, this function being left to the states. There are many vital questions whose scientific exploration would be too costly for the states to prosecute unaided, but whose significance reaches far beyond state lines. It seems to me that the Social Security Board would find it worth while to assist well established state bureaus of research and statistics by making Federal funds available for specific approved projects. I should like to mention here a few subjects for study by a state bureau in which the Board would undoubtedly be interested:

1. Current living costs as related to standards of public assistance.
2. Variation in relief standards of local communities.
3. Nature and characteristics of the relief population with special reference to employability.
4. The financing of relief in rural areas.
5. The effect of relief on municipal finance.
6. Analysis of operating costs of public and private social agencies.

If Federal funds in moderate amounts could be used for such research studies, it would certainly stimulate research in states now handicapped for lack of funds but otherwise well equipped to go ahead.

It is also most desirable that an avenue be opened through which the state directors of research can be placed in touch with the research

projects of other states in advance of formal publication of the findings. It is not only necessary that the state directors know what is being done beyond their own borders, but that they know it soon enough to profit by the experience of others in tackling the same type of problem, and soon enough to avoid costly duplication of effort. Perhaps the national conference of state directors of research and statistics, to be held next October for the second time under the auspices of the Social Security Board, may form the basis for a permanent organization to act as a clearing service for the automatic exchange of research experience.

In closing I should like to invite your attention to certain specific things which a state research bureau and only a state bureau can accomplish. The research bureau in a state agency is in a strategic position to assist in shaping the public welfare program. It is at the pivotal point in relation to the reporting agencies in the local districts on the one side and the Federal agencies, especially the Social Security Board, on the other. The state bureau is in a position to obtain the advice and assistance of the Federal agency with regard to projects to be undertaken, and to stimulate the interest of the local districts in carrying forward projects which have not only local but broader social significance. The director of a state research bureau should make use of the pivotal position of his agency to exert a definite leadership in research, through his contacts with the local agencies, both public and private, within his state. If his qualities of leadership are adequate, he will develop the appetite for research not only within his own department but in the local agencies reporting to the state bureau.

FACTORS AFFECTING THE RATE OF RETURN ON MAILED QUESTIONNAIRES

By Walter Mitchell, Jr.
Dun & Bradstreet, Inc.

THE MAILING of questionnaires resembles in some degree the casting of bread upon the waters. What comes back after many days is likely to be somewhat the worse for wear. It is relatively easy to name the kinds of equipment and safeguards that will help to assure a safe and speedy round trip for a reasonable proportion of the questionnaire sheets. The relative weight of these factors is less known and therefore more open to argument.

The conduct of some forty questionnaire surveys of groups of business enterprises by the Research and Statistical Division of Dun & Bradstreet during the past four years affords the opportunity for a preliminary study. This experience may or may not furnish clues to the factors governing returns in other types of surveys. Reactions of consumers and professional groups, for instance, may be governed by some factors not important in questioning business organizations, and vice versa. However, most of the factors which have been discerned in the course of this work are closely related to basic qualities of human nature—fear, inertia, enthusiasm, and possessiveness, which seem to be present along the entire front line of research in the social sciences. Undoubtedly other factors bear upon the rate of return from business questionnaires but the principal ones appear to be as follows:

1. Selectivity of mailing list—whether it represents a selected group with common interests and a group morale with addresses up to date,
2. Timeliness—whether the subject is a live issue among the group questioned, or has the attraction or novelty,
3. Prestige of the agency—whether the organization mailing the schedules has a reputation for honesty, impartiality, and competence,
4. Salesmanship—a neat and simple appearing questionnaire with a convincing covering letter,
5. Reluctance to identify confidential figures—this is not a clear-cut independent factor in that it is related to the calibre of business men questioned, the urgency of the problem and their confidence in the research agency. The wording of the questionnaire and method of identifying contributors also come into play,
6. Contributor's stake—whether the contributor has a direct or indirect financial stake in the success of the survey and is by that fact impelled to fill out the schedule,

7. Contributor burden—the amount of work which must be done in order to fill out the questionnaire.

Since all of the surveys mentioned in the table and chart were conducted by the Research and Statistical Division of Dun & Bradstreet, the present analysis skips factors 3 and 4—prestige and salesmanship. Any exploration of these two would be a mixture of selfjudgment and guesswork. The relative importance of the remaining factors, however, can be suggested.

Only one of the factors, contributor burden, lends itself to a method of quantitative measurement which seems reasonably objective. One other factor, the fear of disclosure of confidential figures, can be trailed but not caught by distinguishing two classes of surveys: those in which contributors were asked to sign their names, and those where identification was made by serial number. The other factors, such as timeliness of the subject, selectivity of the mailing list, etc. are necessarily matters for arbitrary rating or ranking. Therefore, the rate of return on the questionnaire mailing appears as the abscissa and the contributor burden as the ordinate of the point describing each survey in the scatter chart, while other factors are traced by coding the types of surveys charted.

The contributor burden rating is at this stage of the experiment admittedly a rough measurement. It seems likely on two counts that queries requiring discussion or answer by the contributing concern's executives should have a heavier unit rating than those which can be answered from the record:

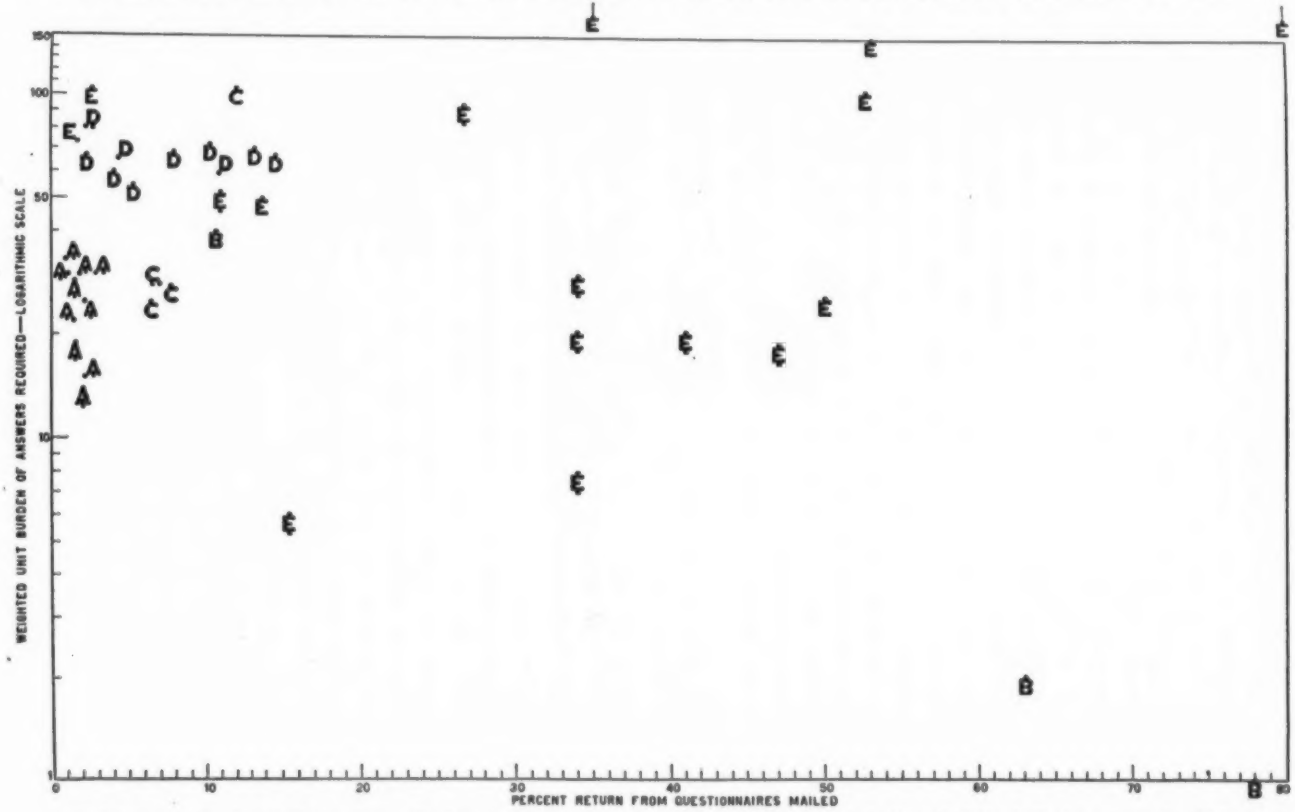
1. Such questions are often qualitative and take more space to ask than a figure. Consequently they make the schedule look more formidable,
2. The filling in of many figures from the concern's records may be the subject of only one executive decision to turn the job over to a clerk, while his personal thought may be necessary on the qualitative answers.

Arbitrarily, the unit burden as shown in the table gives a weight of 1 to each question answerable from the usual concern's records; and a weight of 2 to those questions requiring executive judgment.

The points on the chart, though scattered rather widely, suggest some relation between the amount of work involved and the willingness of a recipient to answer his questionnaire. The natural temptation at this point is to go into a correlation. But a simple correlation would snub those little groups of bashful cases who fail to "get into the groove."

Such single-mindedness would be a mistake, for there seems good reason to believe that every peculiarity in rate of return from questionnaire mailings has a rational explanation if we can only find it.

RELATIONSHIP BETWEEN RATE OF RETURN AND BURDEN ON CONTRIBUTORS IN SURVEYS CONDUCTED BY MAIL



Each letter on the chart indicates the result of one survey. The exact point on the chart is indicated by a dot on an edge or corner of the letter. Letters refer to the several types of surveys listed and grouped in the table. A small black tag at the bottom of a letter indicates a survey in which contributors identified themselves by name and address. In all other surveys returns were identified by serial number.

The chart published here is the latest of several experiments in the grouping and coding of these cases. The object has been to give some clue to the effect of other factors enumerated at the beginning of this discussion. The several questionnaire mailings appear in the table in five groups, which are believed to represent progressively larger likelihood of a good return.

The surveys in Group A seem by description least likely to yield a high rate of return. These broadcast mailings dealt with subjects of general interest but without the appeal of a burning issue. Schedules were sent to every name in the *Dun & Bradstreet Reference Book*—probably the least selective business mailing list which could be found for it covers practically all business. The contributors were impelled to answer only by public spirit and the promise of a copy of the report, but had no financial stake in the survey. Lastly, it was impossible to code number the questionnaires serially and the survey therefore was handicapped by the reluctance of some recipients to identify their returns with name and address.

At the other extreme, in group E, are surveys born and raised under the most favorable conditions. The majority of them enjoy every advantage that money and fond sponsorship could furnish. They were specifically requested and paid for by trade associations. In practically every instance, the association mailed the schedules. They used lists of members of the trade or of the association, supposedly up to date and accurate. The subject was of sufficient interest for the association to be willing to spend a substantial sum on a survey. The association members, often comprising almost the entire industry, were aware that they had a financial stake in the success of the job. In practically every case, the outgoing questionnaires were serially numbered, requiring no name or address and all of them were returned direct to Dun & Bradstreet so that the association staff had no access to individual figures. As will be seen in the detailed discussion below, some wide, but usually explicable variations appear in the rates of return even among this homogeneous group of studies.

Inspecting these groups in some detail, a number of significant points appear. The 1934 and 1935 surveys in group A, with unit burdens ranging between 14 and 32, yielded a typical return of about 1.7 per cent. The factor of timeliness does appear. In 1934 many business men had never previously been given the opportunity to participate in a survey of operating costs, yet already knew the value of such figures by hearsay from members of other trades; hence returns were better in the first survey than in subsequent similar surveys not en-

dowed with a novelty appeal. The trend appears clearly in the manufacturing and wholesaling surveys, where the burden and other important factors remained constant (items A1–A4). The declining rates of return in the four successive retail surveys also reflect an increasing contributor burden. Under some conditions the educational process of repeating a survey after its usefulness has become known to the trade is commonly supposed to yield an increased return, but certainly such is not always the case.

The general broadcast mailing in January, 1938, asked information for the purpose of estimating the trend of business, a subject which appeared more timely than the retailers' operating cost survey of the previous year and the rate of return jumped (items A9 and A10). The question burden was about the same, but in the Business Trend schedule it was possible to arrange the blank spaces in such a manner as to make the job look simpler than the previous year's schedule.

Item B1, a study of the Surtax on Undistributed Profits, represents the exploration of a burning controversial issue through a mailing list selective on two criteria:

1. Corporations only, since the Undistributed Profits Tax did not apply to other types of enterprise, and most of them large enough to be the subject of "analytical" credit reports,

2. Concerns which had previously cooperated with Dun & Bradstreet to the extent of furnishing balance sheets for use in credit reports.

The result was a 10.6 per cent return in spite of a high question burden and a degree of difficulty which is not over-interpreted by the 40 unit rating.

Items B2 and B3, the 1938 and 1939 Mid-year Inventory Surveys, constitute almost an ideal laboratory experiment, because one factor in the equation varied while the others remained practically constant. Only one figure was to be supplied by contributors in the first instance, two figures in the second. In both instances the mailing list of about 23,000 names was drawn from among those concerns who participated in the Business Trend Survey six months earlier. The subject may have been a little more timely in 1938 when inventories were widely discussed as a major cause of the business recession in the fall of 1937 and the first half of 1938. However, neither daily nor trade press had let business forget the subject by mid-1939.

Group C consists of experimental surveys made in 1936 for various trade associations without charge with the object of training staff members in the new research organization. Again the factor of time-

SURVEYS USING MAILED QUESTIONNAIRES

Key number	Year made	Group covered	Type of information asked	Number mailed	Percent return	Burden rating	Identification method	Key number
A		*General Business Surveys—Broadcast Mailing*						
A1	1934	All U. S. manufacturers	Operating statement	141,000	1.2	31	Name	A1
A2	1935	All U. S. manufacturers	Operating statement	141,000	0.9	32	Name	A2
A3	1934	All U. S. wholesalers	Operating statement	50,000	2.8	30	Name	A3
A4	1935	All U. S. wholesalers	Operating statement	50,000	1.7	30	Name	A4
A5	1934	All U. S. retailers	Operating statement	1,700,000	2.1	14	Name	A5
A6	1935	All U. S. retailers	Operating statement	1,700,000	1.6	19	Name	A6
A7	1936	All U. S. retailers	Operating statement	1,700,000	1.5	22	Name	A7
A8	1937	All U. S. retailers	Operating statement	1,700,000	1.5	29	Name	A8
A9	1938	All business enterprises	Sales and inventory trends—credit policy	1,891,000	2.2	25	Name	A9
A10	1939	All business enterprises	Sales and inventory trends—tax payments	2,000,000	2.2	15	Name	A10
B		*General Business Surveys—Selected Mailing Lists*						
B1	1937	Selected manufacturing corporations	Earnings and dividend histories pertinent to Undistributed Profits Tax	6,107	10.6	40	Number	B1
B2	1938	Concerns who participated in 1938 Business Trend Survey	Mid-Year inventory value	27,000	78.0	1	Number	B2
B3	1939	Concerns who participated in 1939 Business Trend Survey	Mid-Year inventory value	16,503	63.1	2	Number	B3
C		*Free Experimental Surveys for Trade Groups*						
C1	1936	Selected large-store members of a retailers' association	Operating figures—monthly sales	350	12.0	105	Number	C1
C2	1936	Manufacturers' association	Operating figures	800	7.8	28	Number	C2
C3	1936	Manufacturers' association	Operating figures	475	6.5	25	Number	C3
C4	1936	Members of a wholesaling trade (no. assn. existing)	Bad debt losses—credit policies	1,500	7.1	28	Name	C4

		assn. existing)	cies					
D		*Surveys of Operating Costs in Coöperation with Trade Associations*						
D1	1937	Wholesale bakers' and confectioners' supply houses	Operating statement	223	10.8	59	Number	D1
D2	1937	Confectionery Wholesalers	Operating statement	7,466	2.4	67	Number	D2
D3	1937	Dry Goods Wholesalers	Operating statement	536	13.4	70	Number	D3
D4	1937	Floor Covering Wholesalers	Operating statement	210	5.7	55	Number	D4
D5	1937	Wholesale Grocers	Operative statement	5,500	2.3	80	Name	D5
D6	1937	Automotive and Equipment Wholesalers	Operating statement	1,500	10.3	72	Number	D6
D7	1937	Paint & Varnish Wholesalers	Operating statement	1,126	4.3	65	Number	D7
D8	1938	Dry Goods Wholesalers	Operating statement	300	14.7	67	Number	D8
D9	1938	Automotive and Equipment Wholesalers	Operating statement	1,200	8.1	69	Number	D9
D10	1938	Paint & Varnish Wholesalers	Operating statement	461	4.1	60	Number	D10
E		*Surveys Made Under Contract for Trade Associations*						
E1	1938	Members of trade assns. & selected non-member cons.	Wage rates and labor policies	97	52.6	105	Number	E1
E2	1939	All manufacturers in the industry	Wage and hour data	143	35.0	166	Number	E2
E3	1939	All wholesale merchants in the trade	Hour data and wage policies	5,283	13.9	50	Number	E3
E4	1935	Members of a manufacturing industry	Operating and financial figures	53	34.0	8	Name	E4
E5	1936	Members of a manufacturing industry	Operating and financial figures	53	34.0	21	Name	E5
E6	1938	Members of a manufacturing industry	Operating and financial figures	53	41.5	21	Name	E6
E7	1939	Members of a manufacturing industry	Operating and financial figures	42	47.0	18	Name	E7
E8	1939	Assn. members & selected non-members	History of shipments & costs	59	80.0	180	Number	E8
E9	1937	All retailers in the trade	Operating and merchandising records	4,250	1.9	75	Number	E9
E10	1939	All retailers in the trade	Oper. & merchandising records	4,500	2.7	104	Number	E10
E11	1935	All California retailers in the trade	Oper. & merchandising records	1,202	11.0	52	Name	E11
E12	1936	Association members	Operating figures	36	50.0	26	Number	E12
E13	1936	Associate Assn. members	Costs and practices in expositions	210	26.7	94	Name	E13
E14	1936	Active Assn. members	Costs and practices in expositions	270	34.1	30	Name	E14
E15	1939	All members of the industry	Simplification of products	30	53.0	150	Number	E15
E16	1939	All members of the industry	History of sales and profits	1,216	15.5	6	Name	E16

liness stands out. Whereas items C2, C3, and C4 may be said to represent the ordinary degree of interest in operating ratios, item C1 was a survey of large retailers who felt that their needs were not adequately met by the general Retail Survey (item A7). There was some feeling that the operating ratios typical of small retailers in the trade were actually confusing and dangerous when applied to these few large concerns. Extensive trade paper discussion and correspondence had developed wide interest. The schedule was sent to a limited, selected mailing list and followed up by the association. Thus, in spite of a unit burden almost three times as great as the other three surveys in the group, the return was almost twice as good.

The surveys in Group D were made on a cooperative cost sharing basis, for the benefit of members of the wholesale trades and Dun & Bradstreet subscribers. The question burden was about the same in all ten cases, but the rate of return ranged all the way from 14.7 down to 2.3 per cent. However, it may be said in general that these joint-cost surveys yielded a better return than the free surveys in Group C, despite heavier contributor burdens. Conversely, the returns were less favorable than from the majority of mailings in Group E where the association financial stake covered the entire cost.

Lowest return among the Group D surveys was obtained from wholesale grocers, the only group which attempted to obtain names and addresses on the returns rather than code number the blanks. The same association, in a later study (item E3) obtained six times as large a return on a questionnaire almost as difficult (though the burden rating is a third less). While a more urgent subject may account for part of the improvement in rate of return, this and other examples suggest that identification by name definitely impedes returns.

The other relatively low rates of return occurred in three trades that lack active independent associations of wholesalers: Confectionery, where the many small wholesalers fail to cohere, and the manufacturers' association public-spiritedly sponsored the survey. Floor coverings, a trade comprising relatively few houses, where the manufacturers also sponsored the work; Paint and Varnish, where wholesaling and retailing are inextricably tangled and a degree of wholesaler unity is maintained only with the benevolent help of the manufacturers' association.

Thus trade organization and discipline appear to bear on rates of return. It consists in part of knowing where the members are, secondly of being able to persuade them to act. Judging from the declarations of

the various associations, some of the mailing lists were in much better condition than others. Even supposing that mailing lists could be compiled with equal care in all trades, the factor of prestige undoubtedly bears on the rate of return. It is no reflection on trade association management that the type of business men forming the majority in certain trades is less disposed to cooperate than those in other trades. Even here it cannot be known, whether operating ratios are inherently less valuable to certain trades, or whether the members of the trade are less able to see the benefit.

Group E comprises surveys where the sponsoring trade association paid the estimated full cost of the survey. In this group the prevailing rates of return are not only far above the rate of return on broadcast mailings, but well above the rate of return where the sponsoring association stood only part of the cost. Outstanding cases are items E1 and E2, surveys of wage rates, hours of work and labor conditions in two manufacturing lines, where one-half and one-third of the members of the respective industries representing two-thirds or more of the production, replied to complicated questionnaires. Timeliness of these surveys—related to the Wage and Hour Act, the Walsh-Healey Act, and collective bargaining requirements—combined with the discipline of a well-knit association group to yield extraordinary results.

Another outstanding example of trade discipline is item E8 where a closely-knit small group of large manufacturers came through 80 per cent strong on a history of shipments and costs having no extraordinary spot news value. The burden rating of 180 units exaggerates, since the required figures were easily obtainable from well-kept corporation records, but the return is in any case remarkable.

The three groups of retailers surveyed naturally yielded lower rates of return than the surveys among manufacturers and wholesalers. Surveys E9 and E10 were nation-wide in a trade characterized by many small stores, whose proprietors are not always apt at record keeping. Furthermore no urgent issue was involved. About five times as good a return (on a somewhat simpler schedule) was obtained in local survey E11, in a trade where a larger average size of establishment prevails. This survey among California retailers was also timely in that it bore directly on the provision of an unfair practices act, approved that year by the local legislature.

As further experiences are accumulated, or when it is possible to pool these records with the experiences of other research organizations, it may be possible to develop a quantitative measurement of the various factors discussed above, and a method for evaluating their relative

weights. For the moment it can at least be said that the ideal return will be obtained from a very brief questionnaire on a burning current issue, sent by a sponsor of undoubted prestige to a mailing list of large enterprises, who have previously cooperated in a similar project. Conversely, if it were possible to combine all of the unfavorable factors which appear to hold down the rate of return—somebody you never heard of should send out broadcast a very long and dull questionnaire on a subject which no one cares about. He would almost certainly be left free to draw upon his imagination in writing the report for the schedules returned would be too few to furnish reliable statistical averages. This latter method is recommended to all students about to attempt a Doctor's thesis, for it has been proved by time and wide experience.

THE CONVERTIBILITY LIST OF OCCUPATIONS AND THE PROBLEMS OF DEVELOPING IT

By Gladys L. Palmer

Industrial Research Department, Wharton School of Finance & Commerce, University of Pennsylvania

Occupational statistics are collected by numerous public and private agencies. Frequently they are by-products of studies with other main objectives or of record-keeping for administrative purposes; more rarely they are the primary purpose of the inquiries from which they are derived. The Census of Population, for example, in the course of getting a wide range of social information, has secured data on the occupations and industries of gainful workers in the population. Perhaps these occupations and industries might be more accurately described as the occupational and industrial labor markets to which workers think they are attached. The public employment offices in the course of administering unemployment insurance and placing persons on jobs classify workers occupationally according to a different criterion. In this instance, placement officers record in the employment office reporting system the occupations for which workers are considered to be best fitted. Still other concepts of occupation are used when the Bureau of Labor Statistics makes a study of wages and hours in specific occupations in defined industries. In such cases, the worker's wages and hours of employment are studied in relation to his specific occupational assignment at the time of the inquiry. These examples will suffice to show that the statistics collected by these agencies measure different aspects of any given occupational labor market.

These measurements of particular aspects of a labor market cannot be correlated or integrated in most instances, however, because of differences in treatment accorded specific occupational titles by the various agencies collecting occupational statistics. Such differences may arise from real dissimilarities in the way in which a given operation is performed in different plants or parts of the country. They also arise from variations in the terminology used by workers, employers, and others to describe a given process or service. Moreover, there are relative degrees of accuracy in the way in which occupational information is secured from different sources of information and these affect the degree of detail which may be used in an occupational classification, as well as the application of general principles of classification. For all of these reasons it has been impossible, in the past, to separate the real differences in occupational data from variations arising from classification and coding practice.

Interest in securing greater comparability between the occupational statistics published by different government and private agencies has been crystallizing over a period of years. Some exploratory work in this direction was done by a conference on occupational classification problems called by the Committee on Labor Statistics of the American Statistical Association in April 1937. This was followed in the summer of 1938 by the appointment of a Joint Committee on Occupational Classification by the American Statistical Association and the Central Statistical Board to continue work on the problem. This Committee included representation from a number of agencies in addition to the American Statistical Association and the Central Statistical Board. The members of the Committee and its Technical Subcommittee are:

*Committee on Occupational Classification of the Central Statistical Board and the American Statistical Association**

Agency	*Main Committee*	*Technical Subcommittee*
Bureau of the Census	Mr. Leon E. Truesdell Mr. Philip M. Hauser (alternate)	Mr. Alba M. Edwards Mr. Ernest J. McCormick (alternate)
Bureau of Labor Statistics	Miss Aryness Joy	Mr. Jacob Perlman Mr. Edward Frazier (alternate)
Bureau of Old Age and Survivors' Insurance	Mr. Merrill G. Murray	Mrs. Katherine Wood (Secretary)
Bureau of Employment Security	Mr. Edward Hollander	Mr. C. A. Heinz
New York State Department of Labor	Mr. Meredith B. Givens	Mr. Dimitry V. Varley
Works Projects Administration	Mr. Howard B. Myers (Chairman)	Miss Mary Dempsey Miss Claire Casey (alternate)
American Statistical Association	Miss Gladys Palmer	Miss Gladys Palmer (Chairman)
Central Statistical Board	Mr. E. Dana Durand Mr. P. K. Whelpton (Secretary)	Mr. P. K. Whelpton

Liaison with the Committee on Industrial Classification: Mr. Bruno Fels

* Mr. William H. Stead was a member of the Committee representing the United States Employment Service until June 30, 1939. Miss Juliette Jones was a member of the Technical Subcommittee representing the Works Progress Administration until June 30, 1939.

A year's work of this Committee and its Technical Subcommittee has resulted in the recommendations which are discussed in this article. Since these recommendations are the result of the consideration of many special problems, of both technical and analytical significance

in a wide range of research fields, a review of the background of the Committee's work may be of assistance in understanding its recommendations.

It was clear at the outset that the most important differences to be resolved reflected varying degrees of precision in the use of occupational terminology by the persons from whom such information was secured. The workers, or, as is more frequently the case, the members of their households who answer questions for the Census of Population, for example, may give fairly precise information or they may give inaccurate answers because of ignorance, carelessness or unwillingness to give information. When the worker applies for a job and is interviewed by an experienced placement officer in a local office of the Employment Service, on the other hand, the chances are that the work record given is both accurate as to fact and precise in job terminology. While it is possible for a man to fabricate a complete work record, this is infrequent because such records are subject to some check during the course of the activities of the public employment bureaus. In any case, the job titles used are relatively precise in terms of the vocabulary of the local labor market. Employers asked to report job assignments of the same persons might, however, report very different titles. This would reflect both differences in fact and in the use of terms. For a variety of reasons, workers tend to give broader occupational titles to describe their jobs than are necessary to designate the specific assignments on which they happen to be working at the moment. The terminology used by employers to describe jobs is more concerned with the particular assignment at the time the information is requested. In addition it reflects the departmental organization of the activities of the concern and may reflect detailed job analysis. The departmental organization of a company and the degree of specialization of operations within departments vary between plants within a given industry. Employers, therefore, not only use job titles which differ from those used by workers, but the practices of employers in the same industry also vary. The basic distinction in occupational data secured from the two major sources of information arises from the fact that the employee describes himself as a worker and the employer describes the work as a job assignment.

These points may be illustrated in the case of a machinist working as an engine lathe operator in the tool room of a machinery manufacturing company. We may assume that he has worked for many years in this capacity, because the company employs only machinists who have served an apprenticeship for this work. Whether he is re-

ported as a machinist or as a machine operator in the Census of Population depends on who answers the questions of the Census enumerator and whether his family call him a machinist, as is likely to be the case. His employer might report him as a machinist, but would be more likely to call him an engine lathe operator. At the employment office, he would be registered as a first-class machinist because the interviewer would know from his work record that the man worked at a plant which accepted only apprenticed machinists for employment in this department.

Under conditions of special study where one has the opportunity to secure supplementary local or plant information, workers can be classified or reclassified in the light of these data. In most surveys, however, the returns must be used as given, or can be edited only by using supplementary information such as the age, sex, race, and education of the person for whom the return is made. In some important instances, such valuable supplementary information as the name and address of the employer is not recorded.

The reliability of occupational and industrial data secured from various sources has frequently been questioned. A comparative check was made during the Committee's work of the occupational designations given for workers by members of their households in a census type of enumeration in Philadelphia and the titles reported by employers for the same workers.[1] Checks have also been made on terminology in reporting occupation and industry when different enumerators visit a household, and when various members of the household are questioned in a census type of enumeration.[2] The findings of these preliminary studies indicate that much more research is necessary in order to measure the degree of accuracy of different sources of information and to develop the best methods of improving the basic data.

The Census of Population has the widest coverage in occupational data, since it includes the entire population. Its occupational returns, however, are recognized as varying from very precise to vague and unclassifiable items. The tendency of persons to up-grade themselves occupationally when enumerated introduces another element of unreliability in Census returns. The unemployment and old age insurance systems have a limited coverage because of the exemption of certain types of employment. The occupational information in the employ-

[1] Katherine D. Wood, "The Statistical Adequacy of Employers' Occupational Records," *Social Security Bulletin*, Vol. 2, No. 5, May 1939.

[2] Gladys L. Palmer, *Employment and Unemployment in Philadelphia in 1936 and 1937*. National Research Project, Works Progress Administration, in cooperation with the Industrial Research Department, University of Pennsylvania, No. P-3, Part I—Appendix D, Part II—Appendix A.

ment office record system is reliable as to accuracy of fact and use of terms, but does not cover all workers. Occupational data on life and death claims which are filed with the Social Security Board for "covered" workers are secured directly from employers. When the Bureau of Labor Statistics makes a study of wages and hours in a particular industry, it defines the industry, limits the occupations to be considered, and secures precise job descriptions as a basis for classifying the occupations reported. This information is very reliable but, again, is limited in coverage. The problem of securing convertibility between statistics compiled by the agencies listed, for example, therefore boiled down to seeking a level of occupational detail which a census type of enumeration could reasonably expect to obtain with some accuracy, and securing agreement upon the content of the titles in such a list among the various agencies concerned with occupational statistics.

Ideally, the undertaking faced by the Committee might have been met by developing a standard occupational classification, during the course of which agreement would have been secured on the definitions of all job titles in all available lists and indices in use. Classification of these titles could then have been made to a grouping system which was also defined by agreement. This was the method used by the Committee on Industrial Classification sponsored by the Central Statistical Board which has recently developed a Standard Industrial Classification, identifying 96 major industry groups and 1,411 industries. It should be noted that this classification was developed for data obtained from employers and the problem of dealing with different sources of information did not exist for them.

The magnitude of the work involved in this approach to a solution of the problem of occupational classification may be visualized when one realizes that, to take just two lists in use, the *Occupational Dictionary* of the United States Employment Service has definitions for approximately 28,000 titles and the *Alphabetical Index to the Census of Occupations* of the Census Bureau contains about 25,000 titles. Each list is admittedly subject to revision since the character of job assignments changes frequently within a plant or within an industry. The size of the task would not have deterred the Committee, however, if the differences in the basic sources of information for occupational data had not raised insuperable barriers to agreement among the agencies on the treatment to be accorded many specific job titles.

The Bureau of Labor Statistics and the employment offices, for example, can and do make distinctions in the grade of skill of "welders." They can distinguish the sheet metal worker or arc welder who works

from blueprints from the man doing simple repetitive machine welding. But the Bureau of the Census and other agencies using the census type of enumeration do not secure returns in sufficient detail to make such a distinction. If all titles in an occupational list were identified specifically, the inability of some agencies to conform would not be an insuperable problem since those which wished to break down "welders" into skill-classes could do so, under the general title of "welders."

It is possible, however, to identify by specific title only a limited number of the old, established and relatively standardized occupations, and to secure agreement as to the content of titles for these occupations. Many of the factory occupations, for example, can not readily be identified by specific title. In these cases job titles for a given operation vary from plant to plant, and as a consequence, relatively few persons are returned for any one of the titles which might be chosen for use. In addition, the same title may occur with different meanings in a number of industries and hence be meaningless without identifying industry information. Such titles as assembler, inspector, packer, trimmer, machine hand, and cutter illustrate this point without need of further comment. In a special check of this general problem made by the Technical Subcommittee, it was found that the majority of workers in the manufacturing industries, with the exception of those in the textile and clothing industries, can not be identified by specific titles. As a consequence, a significant proportion of the workers in any given labor market will fall under general titles which have only a limited occupational significance. They can only be identified as workers in the industries which employ them under some general title, such as, "operatives," "laborers," "semi-skilled workers," "unskilled workers."

Several points of view were represented on the Committee with regard to the solution of these technical problems. At one extreme was the belief that the framework of an occupational classification could be developed using grade of skill as the basis of classification of manual workers. At the other extreme was the opinion that the problem of allocation of skill within industries, not to mention that between industries, was insuperable, and that occupations changed so, both in content and in the terminology describing them, that a general-purpose occupational classification based on skill was not feasible. In this opinion, workers in a labor market could be more accurately described in terms of the industries which employed them and their work status in these industries. A mid-way position between these extremes

was eventually taken by a majority of the members of the Committee.

In this view, it was recognized that occupational content and terminology are in a state of constant flux and that any convertibility list recommended for use must be considered experimental and subject to change after being tested. The relatively well-established and standardized occupations can be identified by specific title and the remainder of the labor supply identified only under broad titles by the industry of employment. In this view, any grouping system should avoid grade of skill since adequate data are not available for making this distinction, except in the case of special research studies or selected sources of information.

Accordingly, the Committee set to work to agree upon a list of occupations to be identified. Numerical importance and the experience of the agencies represented on the Committee in securing adequate returns for a particular title were the most important factors in determining the specific job titles to be identified. In a few instances, unusual or small occupations were identified which were not readily combined with others to make homogeneous groups. The content of these titles was checked by a comparison of the disposition to these titles made by the *Occupational Dictionary* of the United States Employment Service and the classified index of the Bureau of the Census. Both the Bureau of Employment Security and the Bureau of the Census have made sacrifices in the comparability of occupational data to be obtained in the future with those obtained in the past in order to secure greater comparability between their respective systems. Throughout the work of the Committee, the members have taken the position that agreement between agencies as to content is more important than consistency of treatment of specific items, or balance in the distribution of persons obtained by a proposed classification. The convertibility list is not proposed as an ideal classification to meet all purposes. On the contrary, it represents a working agreement among the agencies most concerned with problems of occupational classification which sets a maximum level of occupational detail to be derived on a comparable basis from the various systems now in use.[3] It should perhaps be noted at this point that the list does not represent the maximum detail which any particular agency may wish to secure or publish, but only a level of detail comparable with data from other sources. The use of the list

[3] In the Census of Population of 1940, there will be two titles in the proposed convertibility list for which the Bureau of the Census will not show the proposed breakdown. These titles are "farmers" and "porters."

will permit separation of the differences in occupational statistics which are real from those which arise from variations in coding and classification practices.

The major recommendations of the Committee are that the list of occupational titles prepared by the Committee, or a list convertible to it, be used by agencies collecting and compiling occupational statistics; that a condensation of the Standard Industrial Classification be used for industry data secured from workers or members of their families, and that the coding of occupation, industry, and work status be separated to permit the greatest flexibility in the tabulation and analysis of labor market data. To promote comparative analysis it is urged that agencies which can not adopt the occupational convertibility list completely publish some tabulations which conform to it.

The Convertibility List of Occupations is presented below in a grouped arrangement. It contains 223 occupational titles (exclusive of subdivisions for industry provided under 5 titles) listed under 9 group titles and 8 subgroup titles. Including the industrial subdivisions, the number of undivided items is 327. The 9 major groups and 8 subgroups to which the specific occupational titles have been allocated are the following:

1. Professional and semi-professional workers
   a. Professional workers
   b. Semi-professional workers
2. Proprietors, managers, and officials
   a. Farmers and farm managers
   b. Proprietors, managers, and officials, except farm
3. Clerical, sales, and kindred workers
   a. Clerical and kindred workers
   b. Salesmen and saleswomen
4. Craftsmen, foremen, and kindred workers
5. Operatives and kindred workers
6. Domestic service workers
7. Protective service workers
8. Service workers, except domestic and protective
9. Laborers
   a. Farm laborers and foremen
   b. Laborers, except farm

It should be noted that where work status or industry designations appear in the list or group titles they are used as identifying information for distinctions which are primarily occupational in character.

An attempt was made to secure relatively homogeneous occupational groups under the group titles.

The proposed groups were derived in the course of a review of the content of the specific titles of the list and of the experience of the agencies represented on the Committee with regard to the reliability of returns for specific titles, keeping in mind that the grouping system must be relatively easily obtained from the details of the major occupational classification systems now in use. The administrative needs of certain agencies also influenced the decision of the Committee in specific instances. At one stage of the Committee's work it looked as if agreement could be obtained only on such broad groups as "white collar" and professional workers, on the one hand, and manual workers, on the other. Gradually, the first four groups emerged from the Committee's discussion in approximately their present form. Workers performing various types of personal services, building attendants, domestic servants, and workers classified here as "protective service workers" were difficult to group because the distinctions in grade of skill, responsibility, or type of service are difficult, if not impossible, to make. The proposed grouping for these workers represents a compromise of wide differences of opinion about the appropriate treatment for them in an occupational classification. The workers now classified as "operatives and kindred workers" and "laborers" also presented special problems, because of the fact that some agencies wished to use for their combined coverage more than two groups based on distinctions of skill and other agencies could not make these distinctions.

It is not possible in the scope of this article to explain the reasons for all of the decisions made by the Committee. An understanding of the content of the specific titles in the list can be secured only by reference to an index to the titles. It is the hope of the Committee that such an index may be prepared and published at a later date. Until this is ready, the reader is referred for the delimitation of the content of all specific titles in the accompanying list to the *Occupational Dictionary* of the United States Employment Service and to the *Alphabetical Index of Occupations* in preparation for the Census of Population of 1940.

The list of occupations presented at this point, to which all agencies are requested to maintain convertibility in future coding and tabulation of occupational statistics, is not regarded as a final product. It is proposed as a basis of use for a limited period of time, perhaps 5 years, after which all of the questions briefly outlined here are to be reopened for further discussion in the light of experience with this list.

CONVERTIBILITY LIST OF OCCUPATIONS BY MAJOR GROUPS[1]

1. **Professional and semiprofessional workers**
   - a. *Professional workers*
     - Actors and actresses
     - Architects
     - Artists and art teachers
     - Authors, editors, and reporters
     - Chemists, assayers, and metallurgists
     - Clergymen
     - College presidents, professors, and instructors
     - County agents and farm demonstrators
     - Dentists
     - Engineers, technical
       - Chemical engineers
       - Civil engineers
       - Electrical engineers
       - Industrial engineers
       - Mechanical engineers
       - Mining and metallurgical engineers
     - Lawyers and judges
     - Librarians
     - Musicians and music teachers
     - Osteopaths
     - Pharmacists
     - Physicians and surgeons
     - Social and welfare workers
     - Teachers n.e.c.[2]
     - Trained nurses and student nurses
     - Veterinarians
     - Professional workers n.e.c.
   - b. *Semiprofessional workers*
     - Athletes, and sports instructors and officials
     - Aviators
     - Chiropractors
     - Dancers, dancing teachers, and chorus girls
     - Designers
     - Draftsmen
     - Funeral directors and embalmers
     - Healers and medical service workers n.e.c.
     - Optometrists
     - Photographers
     - Radio and wireless operators
     - Religious workers
     - Showmen
     - Surveyors
     - Technicians and assistants, laboratory
     - Technicians, except laboratory
     - Semiprofessional workers n.e.c.
2. **Proprietors, managers, and officials**
   - a. *Farmers and farm managers*
     - Farmers (owners)
     - Farmers (tenants)
     - Farm managers
   - b. *Proprietors, managers, and officials, except farm*
     - Advertising agents
     - Buyers and department heads, store
     - Conductors, railroad
     - Country buyers and shippers of livestock and other farm products
     - Credit men
     - Floormen and floor managers, store
     - Inspectors, government
     - Managers and superintendents, building
     - Officers, pilots, pursers, and engineers, ship
     - Officials, lodge, society, union, etc.
     - Postmasters
     - Public officials n.e.c.
     - Purchasing agents and buyers n.e.c.[3]

[1] The abbreviation "n.e.c." means "not elsewhere classified."

[2] Excludes college teachers and teachers of art, dancing, music, and athletics.

[3] Includes most buyers of commodities except commission brokers, buyers, for stores, and country buyers and shippers of livestock, and other farm products.

Proprietors, managers, and officials, n.e.c., *classified by industry*
Mining
Construction
Manufacturing
Transportation, communication, and utilities
Wholesale trade
Retail trade
Food stores, except dairy products
Dairy products stores and milk retailing
General merchandise stores
Limited price variety stores
Apparel and accessories stores, except shoes
Shoe stores
Furniture and housefurnishings stores
Household appliance and radio stores
Motor vehicles and accessories retailing
Filling stations
Drug stores
Eating and drinking places
Hardware and farm implement stores
Lumber and building material retailing
Liquor stores
Retail florists
Jewelry stores
Fuel and ice retailing
Miscellaneous retail stores
Not specified retail trade[4]
Finance, insurance, and real estate
Business and repair services
Personal services
Amusement, recreation, and related services
Miscellaneous industries and services[5]

3. Clerical, sales, and kindred workers

a. *Clerical and kindred workers*
Agents n.e.c.
Attendants and assistants, library
Attendants, physicians' and dentists' offices
Baggagemen, transportation
Bookkeepers, accountants, and cashiers
Collectors, bill and account
Express messengers and railway mail clerks
Mail carriers
Messengers, and errand and office boys and girls[6]
Office machine operators
Shipping and receiving clerks
Stenographers, typists, and secretaries
Telegraph messengers
Telegraph operators
Telephone operators
Ticket, station, and express agents
Clerical and kindred workers, n.e.c.

b. *Salesmen and saleswomen*
Auctioneers
Canvassers and solicitors
Demonstrators
Hucksters and peddlers
Insurance agents and brokers
Newsboys
Real estate agents and brokers
Salesmen, finance, brokerage and commission firms
Traveling salesmen and sales agents
Salesmen and saleswomen n.e.c.

[4] May include some returns not specified as to whether the workers were in wholesale or retail trade.
[5] Includes "Proprietors, managers and officials n.e.c." in all industry groups not specifically listed.
[6] Delivery boys are included under "Deliverymen" (see footnote 11).

4. Craftsmen, foremen, and kindred workers
- Bakers
- Blacksmiths, forgemen, and hammermen
- Boilermakers
- Brickmasons, stonemasons, and tile setters
- Cabinetmakers
- Carpenters
- Cement or concrete finishers
- Compositors and typesetters
- Cranemen, hoistmen, and construction machinery operators
- Decorators and window dressers
- Electricians
- Electrotypers and stereotypers
- Engravers, except photoengravers
- Foremen, *classified by industry*
  - Mining
  - Construction
  - Manufacturing
    - Food and kindred products
    - Textiles, textile products, and apparel
    - Lumber, furniture, and lumber products
    - Paper, paper products, and printing
    - Chemical and petroleum and coal products
    - Metal industries
    - Manufacturing industries n.e.c. and not specified
  - Transportation, communication, and utilities
  - Wholesale and retail trade
  - Miscellaneous industries and and services[7]
- Furriers
- Glaziers
- Heat treaters, annealers, and temperers
- Inspectors n.e.c., *classified by industry*[8]
  - Construction
  - Transportation, communication, and utilities
  - Wholesale and retail trade
  - Miscellaneous industries and services[9]
- Inspectors, scalers, and graders, log and lumber
- Jewelers, watchmakers, goldsmiths, and silversmiths
- Locomotive engineers
- Locomotive firemen
- Loom fixers
- Machinists
- Mechanics and repairmen
  - Mechanics and repairmen, airplane
  - Mechanics and repairmen, automobile
  - Mechanics and repairmen, railroad and car shop
  - Mechanics and repairmen n.e.c.
- Millers, grain, flour, feed, etc.
- Millwrights
- Molders, metal
- Opticians, and lens grinders and polishers
- Painters, construction and maintenance[10]
- Paperhangers
- Pattern and model makers, except paper
- Photoengravers and lithographers
- Piano and organ tuners
- Plasterers
- Plumbers, and gas and steam fitters
- Pressmen and plate printers, printing
- Rollers and roll hands, metal
- Roofers and slaters
- Sawyers

[7] Includes "Foremen (except farm foremen)" in all industry groups not specifically listed.

[8] Most of the inspectors in the respective manufacturing industries are classified with the operatives.

[9] Includes "Inspectors n.e.c." in all industry groups not specifically listed.

[10] Includes painters, varnishers, lacquerers, and enamelers, building, shipyard, railroad, etc.

Shoemakers and repairers (not in factory)
Stationary engineers
Stonecutters and stone carvers
Structural and ornamental metal workers
Tailors and tailoresses
Tinsmiths, coppersmiths, and sheet metal workers
Tool makers, and die makers and setters
Upholsterers

5. **Operatives and kindred workers** (including "mine laborers")
Apprentices, building and hand trades
Carpenters' apprentices
Electricians' apprentices
Machinists' apprentices
Plumbers' apprentices
Building and hand trade apprentices n.e.c.
Apprentices, printing trades
Apprentices, specified occupations n.e.c.
Apprentices, occupations not specified
Asbestos and insulation workers
Attendants, filling station, parking lot, garage, and airport
Blasters and powdermen
Boatmen, canalmen, and lock keepers
Brakemen, railroad
Chainmen, rodmen, and axmen, surveying
Chauffeurs and drivers, bus, taxi, truck, and tractor[11]
Conductors, bus and street railway
Deliverymen[11]
Dressmakers and Seamstresses (not in factory)
Dyers
Filers, grinders, buffers, and polishers, metal
Firemen, except locomotive and fire department
Fruit and vegetable graders and packers, except in cannery
Furnacemen, smeltermen, and pourers
Heaters, metal
Laundry operatives and laundresses, except private family
Linemen and servicemen, telegraph, telephone, and power
Meat cutters, except slaughter and packing house
Milliners (not in factory)
Mine operatives and laborers
Motion picture projectionists
Motormen, street, subway, and elevated railway
Motormen (vehicle), mine, factory, logging camp, etc.
Oilers, machinery
Painters, except construction and maintenance[12]
Photographic process workers
Power station operators
Sailors and deck hands, except U. S. Navy
Switchmen, railroad
Welders and flame-cutters
Operatives and kindred workers n.e.c., *classified by industry*
Construction
Manufacturing
Food and kindred products
Tobacco manufacturers
Textile-mill products
Apparel and other fabricated textile products
Logging, sawmills, and planing mills

[11] Drivers of coal trucks and oil trucks are included under "Chauffeurs and drivers, bus, taxi, truck and tractor," while truck drivers (including helpers and "jumpers") and delivery boys for bakeries, laundries, dry cleaning establishments, stores, and such establishments as dental laboratories, shoe repair shops, printing and engraving shops, tailor shops, and photographic studios are included under "Deliverymen."

[12] Includes painters, varnishers, lacquerers, and enamelers of factory products and those working in shops.

- **5. Operatives and kindred workers—**
  - Continued
  - Operatives and kindred workers n.e.c., *classified by industry*—
    - Continued
      - Furniture and finished lumber products
      - Paper and allied products
      - Printing, publishing, and allied industries
      - Chemicals and allied products
      - Petroleum and coal products
      - Rubber products
      - Leather and leather products
      - Stone, clay, and glass products
      - Iron and steel and their products
      - Nonferrous metals and their products
      - Electrical machinery and equipment
      - Machinery, except electrical
      - Automobiles and automobile equipment
      - Transportation equipment, except automobiles
      - Not specified metal industries
      - Miscellaneous manufacturing industries
      - Not specified manufacturing industries
    - Railroads (includes railroad repair shops)
    - Transportation, except railroads
    - Communication and utilities
    - Wholesale and retail trade
    - Business and repair services
    - Personal services
    - Amusement, recreation, and related services
    - Professional and related services
    - Government
    - Miscellaneous industries and services[13]
    - Nonclassifiable
- **6. Domestic service workers**
  - Housekeepers, private family
  - Laundresses, private family
  - Servants, private family
- **7. Protective service workers**
  - Firemen, fire department
  - Guards, watchmen, and doorkeepers
  - Marshals and constables
  - Policemen and detectives, government
  - Policemen and detectives, except government
  - Sheriffs and bailiffs
  - Soldiers, sailors, marines, and coast guards n.e.c.[14]
  - Watchmen (crossing) and bridge tenders
- **8. Service workers, except domestic and protective**
  - Attendants, hospital and other institution
  - Attendants, professional and personal service n.e.c.
  - Attendants, recreation and amusement
  - Barbers, beauticians, and manicurists
  - Bartenders
  - Boarding house and lodginghouse keepers
  - Bootblacks
  - Charwomen and cleaners
  - Cooks, except private family
  - Elevator operators
  - Housekeepers, stewards, and hostesses, except private family
  - Janitors and sextons
  - Porters
    - Baggage porters
    - Pullman porters
    - Porters n.e.c.

[13] Includes "Operatives and kindred workers n.e.c." in all industry groups not specifically listed.

[14] Excludes commissioned officers, professional and clerical workers, and craftsmen, who are classified with other workers in their respective occupations.

Practical nurses and midwives
Servants, except private family
Ushers, amusement place or assembly
Waiters and waitresses, except private family

9. **Laborers**
   a. *Farm laborers and foremen*
      Farm laborers
      Croppers[15]
      Farm foremen
   b. *Laborers, except farm and mine*
      Fishermen and oystermen
      Garage laborers, and car washers and greasers
      Gardeners (except farm) and groundkeepers
      Longshoremen and stevedores
      Lumbermen, raftsmen, and wood choppers
      Teamsters
      Laborers n.e.c. *classified by industry*
         Construction
         Manufacturing
            Food and kindred products
            Tobacco manufactures
            Textile-mill products
            Apparel and other fabricated textile products
            Logging, sawmills, and planing mills
            Furniture and finished lumber products
            Paper and allied products
            Printing, publishing, and allied industries
            Chemicals and allied products
            Petroleum and coal products
            Rubber products
            Leather and leather products
            Stone, clay, and glass products
            Iron and steel and their products
            Nonferrous metals and their products
            Electrical machinery and equipment
            Machinery, except electrical
            Automobiles and automobile equipment
            Transportation equipment, except automobiles
            Not specified metal industries
            Miscellaneous manufacturing industries
            Not specified manufacturing industries
         Railroads (includes railroad repair shops)
         Transportation, except railroad
         Communication and utilities
         Wholesale and retail trade
         Business and repair services
         Personal services
         Amusement, recreation, and related services
         Professional and related services
         Government
         Miscellaneous industries and services[16]
         Nonclassifiable

The use of the Convertibility List of Occupations by the major agencies securing occupational statistics will place that phase of labor market or occupational studies which are concerned with comparative

[15] The classification of "Croppers" here instead of under "Farmers and farm managers" is subject to the final disposition of this title in the 1940 Census of Population.

[16] Includes "Laborers n.e.c." in all industry groups not specifically listed, except mining. Mine laborers are included with mine operatives in group 5.

analysis on a sound technical basis. In the future, variations in the numbers of persons in a particular city reported as *coal miners* in the Census of Population, for example, or as in receipt of relief or on WPA, or as securing unemployment benefits, or as in receipt of specific wage rates or earnings, or for whom death claims have been filed with the Social Security Board, will have genuine significance in relation to the coverage and administrative problems of the reporting agencies. This is because all of these agencies, irrespective of the source of their information, have agreed on precisely which persons shall be classified as *miners in coal mines.*

During the course of the Committee's work, it was recognized that there is a demand for at least two kinds of labor market information, namely data which describe the broad occupational and industrial labor markets to which workers are usually attached, and data which describe, in terms of work status, occupation, and industry, the workers attached to different types of economic enterprises. It is recognized by the Committee that only by cross-tabulating work status by industry, industry by occupation, and combinations of these can one obtain an adequate picture of the labor market.

For use in conjunction with the Convertibility List of Occupations, the Committee recommends the *Industrial Classification for Reports from Individuals,* prepared in cooperation with the Committee on Industrial Classification. This is a condensation of the Standard Industrial Classification, specifically developed for coding industrial information obtained from individual workers or members of their families. Copies of this list may be secured from the Central Statistical Board.

NOTES

A METHOD OF GRAPHIC INTERPOLATION

1. *Introduction.* Sometimes a statistician is required to interpolate or extrapolate from known points. If he has plenty of time he may wish to compute the points from some interpolation formula; but if there is need for speed and he feels that free-hand smoothing is too arbitrary, he may wish to adopt a method that combines some of the accuracy of a formula and the speed of simple graphic methods. The purpose here is to call attention to Aitken's[1] geometrical interpretation of his linear iteration method, and to show an easy extension to the bivariate case. In what follows it is assumed that polynomial interpolation is possible, and that the remainder term is negligible.

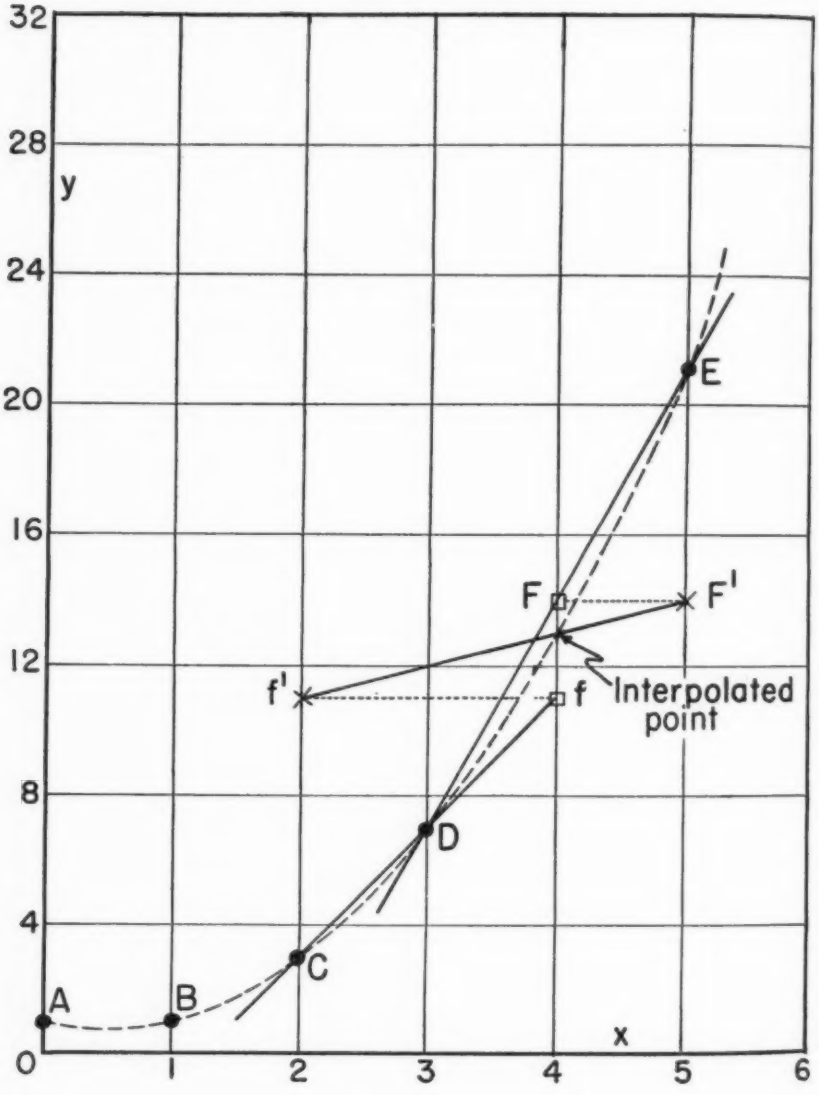
2. *An example in quadratic interpolation.* Fig. 1 shows 5 points—A, B, C, D, E, of coordinates as follows:

Point	x	y
A	0	1
B	1	1
C	2	3
D	3	7
E	5	21

Suppose we wish to know what is the y-value corresponding to $x=4$. Select a "lead point" as near as possible to $x=4$, so that the interpolated point will if possible be central to the fixed points on which the interpolation is to be based. Of course, for extrapolation the interpolate is necessarily exterior, but the central location is to be preferred when possible, for the more rapid convergence and less mechanical error. We accordingly select D for the lead point and draw the chords DE and DC, which cut the vertical line $x=4$ at the points F and f. We need to interpolate linearly between these two points. To do this, we project them horizontally to the vertical lines through E and C, respectively, connect F′ and f′ with a straight edge, and read the interpolated ordinate $y=13$ at $x=4$. The reader may have noticed that the given points lie on the quadratic $y=1-x+x^2$, and that the interpolated point $x=4$, $y=13$ lies on this locus. No higher degree of interpolation is possible here, the function itself being quadratic.

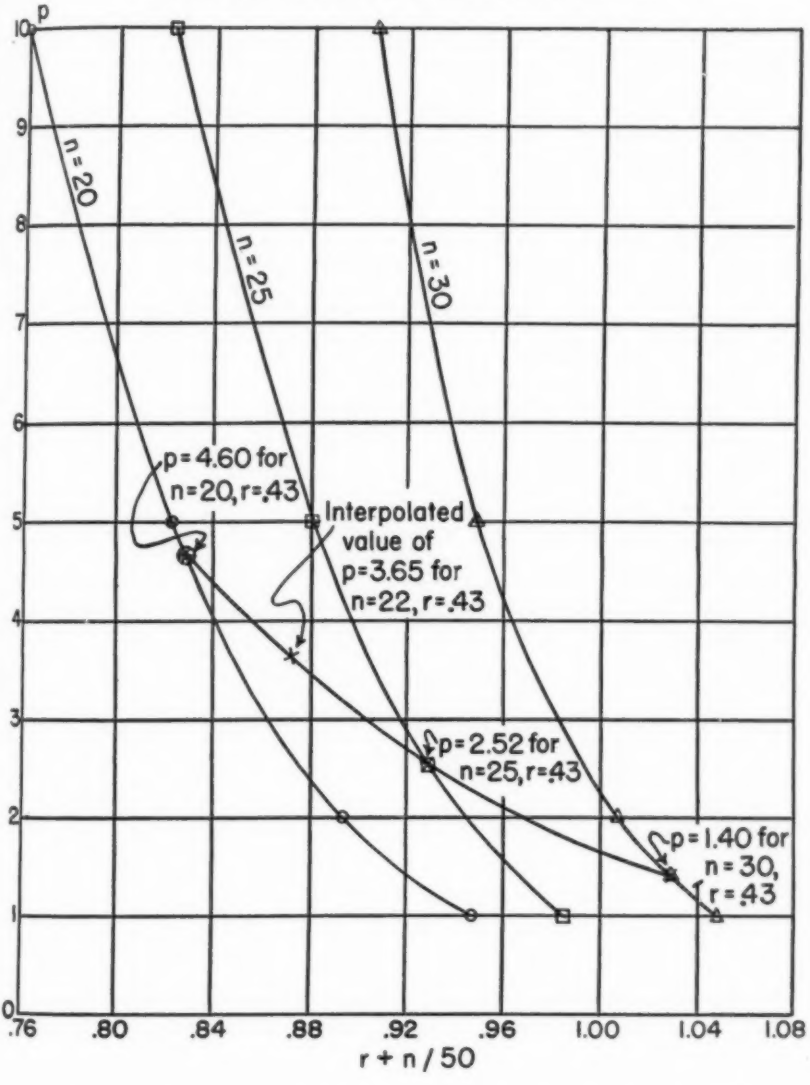
[1] A. C. Aitken, *J. Edinburgh Math. Soc. Proceedings.* Series 2, vol. III, Part 1, 1932; p. 73 in particular.

FIGURE 1
SECOND DEGREE INTERPOLATION BY CONSTRUCTION



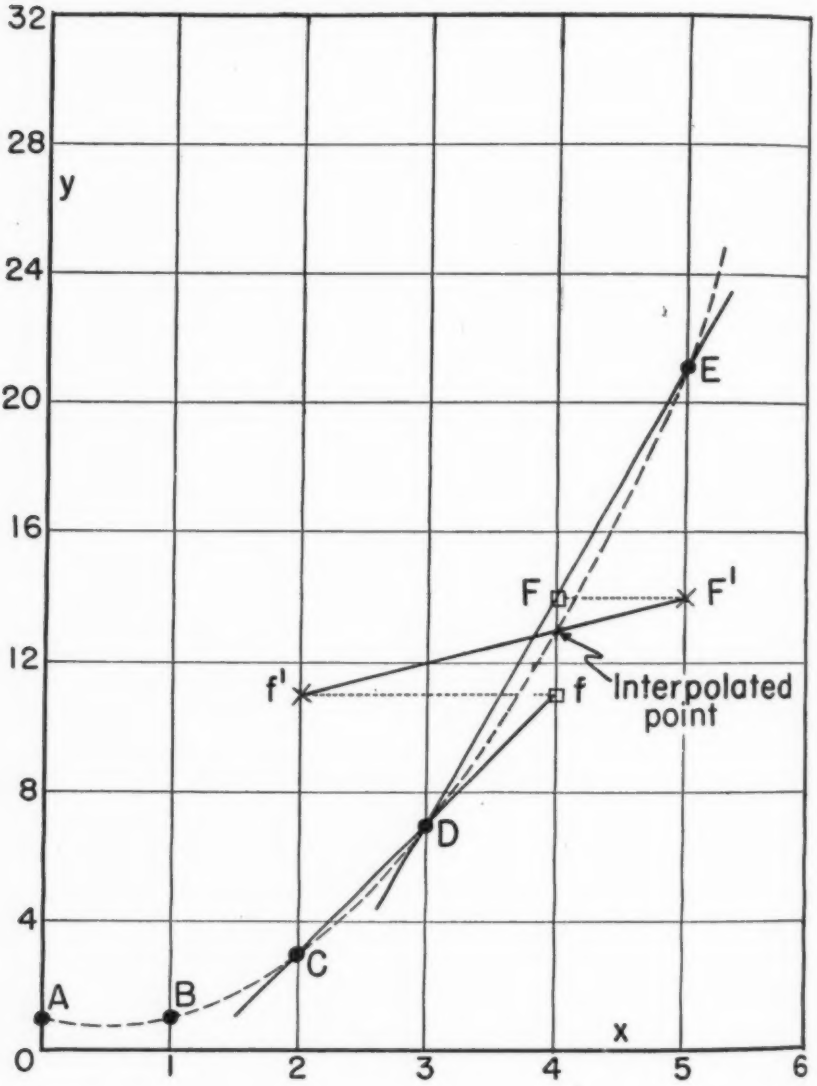
3. *Cubic interpolation.* This technique may be expanded to the third degree by using four points to make the interpolation. The four points are so selected that two fall each side of the interpolate, or else as close to it as possible. For extrapolation, or near the end of a table this of

FIGURE 2
BIVARIATE INTERPOLATION BY CONSTRUCTION
PROBLEM: FIND p FOR $n=22$ AND $r=0.43$ (SEE TEXT)



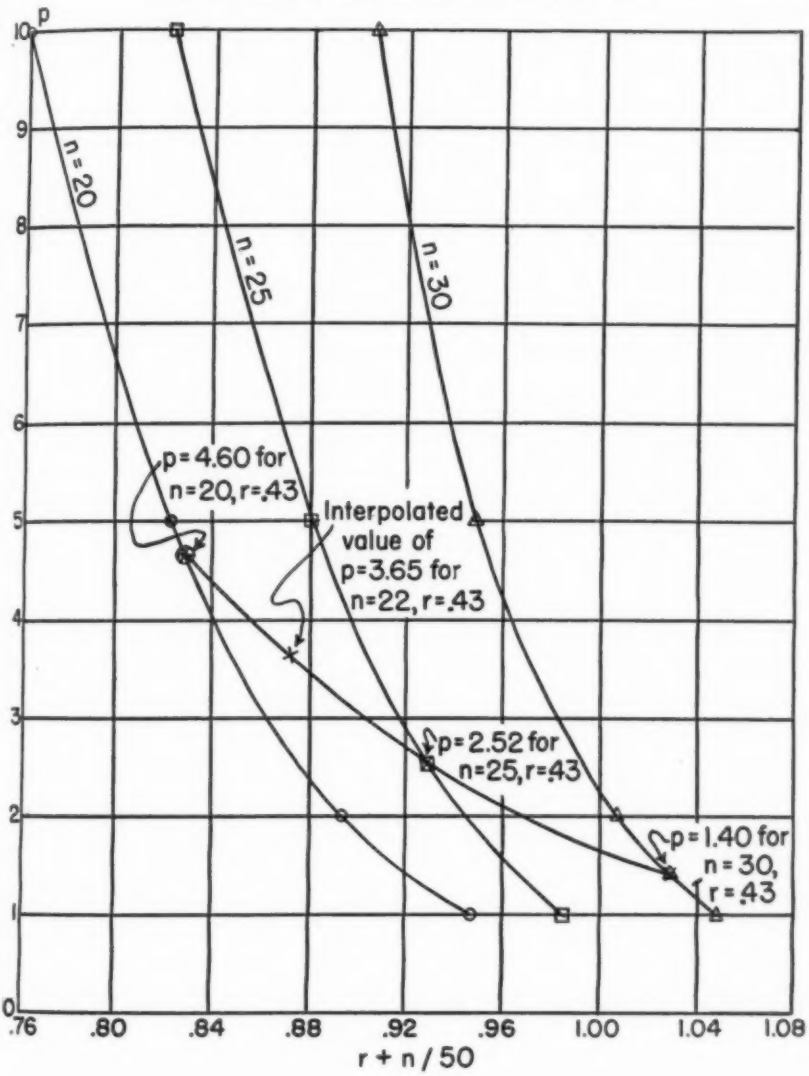
course can not be arranged. In any event a lead point is selected near the interpolate z, and chords are drawn from it to the other three interpolants. These three chords cut the vertical line $x=z$ at three points which are then projected horizonally to the three respective abscissas

FIGURE 1
SECOND DEGREE INTERPOLATION BY CONSTRUCTION



3. *Cubic interpolation.* This technique may be expanded to the third degree by using four points to make the interpolation. The four points are so selected that two fall each side of the interpolate, or else as close to it as possible. For extrapolation, or near the end of a table this of

FIGURE 2
BIVARIATE INTERPOLATION BY CONSTRUCTION
PROBLEM: FIND p FOR $n=22$ AND $r=0.43$ (SEE TEXT)



course can not be arranged. In any event a lead point is selected near the interpolate z, and chords are drawn from it to the other three interpolants. These three chords cut the vertical line $x=z$ at three points which are then projected horizonally to the three respective abscissas

of the original points that were used with the lead point. We then have three points determining a second degree curve which intersects the vertical line $x=z$ at the interpolated point. It is only necessary to apply the earlier method for quadratic interpolation to find it.

4. *Some remarks.* It should be pointed out that it is not necessary that the interpolants be equally spaced. Also the choice of units on the scale of abscissa and ordinate may be arbitrary. In practice it is not actually necessary to draw in the chords; their intersection with the vertical may be determined with a straight edge. Neither is it necessary to make any attempt at drawing in the smoothed curve first. Moreover, the method applies as well to extrapolation, except that the fixed points are then all to one side, the lead point ordinarily being the nearest one. For inverse interpolation the procedure is similar, the points of intersection of the chords with the required horizontal now being projected vertically. This is often of use in estimating the real roots of an equation that has no simple algebraic solution.

By induction we might carry this method to the fourth and fifth degrees but the procedure soon becomes so involved that the theoretical precision that might be gained is lost in an ever increasing mechanical error. However, the second and third degree interpolation is sufficiently fast and precise to be useful in many statistical procedures.

5. *Extension to bivariate interpolation.* The foregoing notions may be extended to bivariate interpolation. Suppose we wish to find p corresponding to $n=22$ and $r=.43$ in the following table. Lay off one axis for p and another axis for any linear function of r and n, say $Ar+Bn$, A and B being so chosen that the curves showing p plotted against $Ar+Bn$ for constant values of n will take on a form and

	Values of r			
n	$p=10$	5	2	1
20	.360	.423	.492	.537
25	.323	.381	.445	.487
30	.296	.349	.409	.449

separation that is convenient to work with. In this particular problem, we may take $r+n/50$ for the function of r and n, and form the following table.

	Values of $r+n/50$			
n	$p=10$	5	2	1
20	.760	.823	.892	.937
25	.823	.881	.945	.987
30	.896	.949	1.009	1.049

These points are plotted in fig. 2. With the univariate graphic method previously described we now find the interpolated value of p for $r+n/50=.83$, using the four points on the curve for which $n=20$. We then repeat the same process on the curves for $n=25$ and $n=30$. Having now three interpolated points corresponding to $r=.43$, we interpolate to $n=22$, to find $p=3.65$, the required result. In practice, A and B are usually such simple numbers that the second table is hardly needed, the points in fig. 2 being plotted directly from the original entries of r, n, and p.

The author is much indebted to Dr. W. Edwards Deming for showing him the Aitken method, and for continued help and encouragement in the preparation of this note.

J. STEVENS STOCK

Work Projects Administration

ON AN EXPERIMENT IN THE TEACHING OF STATISTICS

THE limitations and deficiencies of the lecture method need not be detailed. Professor Rathburn of Stanford University exhausted the topic when he declared: "A lecture is a process whereby the notes of the professor become the notes of the student without passing through the minds of either."

In recent years in those academic halls where budgetary paralysis has not set in to halt progress, the combined classroom recitation—laboratory method has come to prevail. Hailed at first as the paragon of progress, its defects have become increasingly apparent. The good teacher is half actor, half scholar. The competent statistician is rarely the sparkling captivator who keeps students from slumber through the sheer power of personality. Accordingly the classroom becomes, more often than not, the abode of boredom, however conscientious the instructor may be. Timidity keeps the student from the temptation of asking a question to clear up a difficulty and terror ties his tongue if he is called upon to recite. The brilliant instructor sets the tempo of his class to the tastes of the clever students, while the slow learners lag dismally in their mire. The thorough teacher drills, pounds, and repeats until his incessant bombing penetrates even the thickest of skulls, but alas the clever chap chafes at the restraint.

To suggest the complete elimination of formal classroom procedure in the introductory course may seem heretical. However, the alternative works splendidly. The student is given the best text available. Then he is given a set of mimeographed pages upon which we have set down what we might ordinarily say in class, except that these carefully considered discussions, written in the most understandable and simple manner are built around the text. They explain difficult points, stress matters of importance, answer questions which experience has shown that students will traditionally and repeatedly raise. Then a page of questions confronts the student. It contains the traditional laboratory exercises as well as a number of thought questions. Our laboratory is open the entire day. It becomes in turn a workshop, a statistical forum, a spontaneous discussion group, a social club for enterprising scholars. Informality is the keynote. A young but very competent laboratory supervisor may suggest rereading a certain page or paragraph for a revealing clue to a difficult problem. He may ask a leading or revealing question but he goes no further.

The culmination of the method is the conference. Answers to the

problems are scanned briefly. If they are satisfactory we begin with questions designed to discover whether the student understands what he has been doing and why. How often have students worked out a laboratory problem correctly step by step and yet not understood the "why" of what they were doing? If some problems have not been answered, the student is led to the solution by careful questioning. Then he is free to question us concerning matters which may still puzzle him, though in all but a few rare cases our previous searching has unearthed the difficulties. Each student is permitted to proceed as rapidly as his capacity permits. The conference room, to a far greater extent than the classroom, reveals individual abilities and disabilities, aptitudes, and problems. In the classroom the instructor explains to the student, often with a varying success which is difficult to determine. In the conference room the student explains to the instructor. And to explain he must know. When the semester is over he does. *Docendo discimus.*

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STATISTICAL NEWS AND NOTES

The 1939 Census of Manufactures

The twenty-third Census of Manufactures will cover the year ended December 31, 1939. Manufacturing activities of this country have been charted by censuses for the past 130 years, the first census covering the year 1809. The 1939 Census of Manufactures, which is taken in conjunction with the Census of Business and the Census of Mines and Quarries, will start on January 2, 1940. Each manufacturing establishment in the United States will be visited by a census enumerator equipped with schedule forms on which to obtain the necessary data. One general schedule, one administrative office schedule, and 147 special schedules will be used in the collection of data covering approximately 200,000 manufacturing establishments which will be classified in approximately 400 industries. The special schedules differ from the general schedule primarily in Inquiry 10 which covers products made and work done during the year. The special schedules call for separate statistics on various commodities produced both as to quantity and value. The special schedules will be used for all industries with the exception of 17 or 18 of the smaller ones. Information for these small industries will be collected on the general schedules.

All the schedules call for the following information:

Inquiry 1. Description of plant: Form of organization and location of plant.

Inquiry 2. For the first time, an effort will be made to cover all persons connected with the plant who received pay during a normal pay-roll period ended nearest October 14, 1939; (1) number of proprietors or firm members, (2) total of all employees for the plant excluding proprietors or firm members, (3) salaried officers of the corporation, (4) employees engaged in manufacturing, (5) employees engaged in distribution, (6) employees engaged in construction, and (7) employees engaged in other types of work (type of work performed to be stated). The employees reported under this inquiry are separated into male and female. The employees engaged primarily in manufacturing, group 4 above, are further subdivided into (1) managers, superintendents, and other supervisory employees, (2) clerks, stenographers, bookkeepers, and other clerical employees, and (3) wage earners. The purpose of this separation is to give comparable figures with prior censuses.

Inquiry 3. Wage earners employed by months.

Inquiry 4. Salaries and wages. The total salaries and wages paid to the various groups of persons employed, listed under Inquiry 2, (except proprietors and firm members) are to be reported under this inquiry. There is, however, no sex breakdown.

Inquiry 5. (1) Cost of materials, supplies, and containers for products actually used during the year, (2) cost of fuel, (3) cost of purchased electric energy, and (4) cost of contract and commission work.

Inquiry 6. Power equipment. This inquiry is the same as the power equipment inquiry used in the 1935 census and calls for steam engines, steam turbines, Diesel and semi-Diesel engines, other internal combustion engines, and hydro-turbine and water wheels, active or idle, classified as to whether they are prime movers driving generators or prime movers not driving generators. Standby equipment is also called for separately as are electric motors driven by purchased energy and electric motors driven by energy generated in the plant.

Inquiry 7. Fuel and electric energy used. This inquiry is the same as the fuel and electric energy inquiry used in the past several censuses and calls for the quantity of bituminous and anthracite coal, coke, fuel oil, natural, manufactured, and mixed gas, total amount of electric energy generated in the plant, total amount of electric energy sold and total amount of electric energy purchased.

Inquiry 8. Expenditures for plant and equipment. This inquiry is entirely new for the Census of Manufactures. The purpose of the inquiry is to obtain information on the flow of capital into new plant and equipment. This information will be very valuable in the preparation of estimates of national income. The inquiry will request total expenditures for plant, equipment and real estate made during the year by the reporting plant. This total is subdivided into (1) expenditures for new construction or major alterations of buildings and other fixed plant and structures, (2) expenditures for new machinery and operating equipment, and (3) expenditures for plant and equipment acquired in a "used" condition from other owners and expenditures for land.

Inquiry 9. Inventory. This inquiry calls for inventories of (a) finished products of the plant, and (b) materials, supplies, fuel, work in process, and all other inventories for the beginning of the year and for the end of the year. This is the second time this information has been requested on the Census of Manufactures schedules. The information obtained from this inquiry in the 1937 Census of Manufactures was satisfactory beyond expectation. Establishments whose value of products amounted to 94.6 per cent of the total value of products reported to that Census answered this inquiry satisfactorily. It is worth noting that this inventory inquiry covers each year even though the census is taken every two years, since the end of 1937 is the beginning of 1938 and the end of 1938 is the beginning of 1939.

Inquiry 10. Products made and work done during the year. This inquiry differs with each schedule as noted above. It is one of the more important inquiries since it is from this inquiry that the statistics for the various types of products manufactured are obtained.

In addition to these inquiries, the chief materials used in manufacturing, the types of equipment used and man-hour statistics will be obtained on a number of the special schedules.

A single page schedule calling for information as to the various channels used by the manufacturer in the distribution of his products is attached to

all schedules except those for the printing and publishing industries, cars and locomotives, shipbuilding, and motion pictures. These schedules will be turned over to the Census of Business to be included as part of that census.

The statistics, which will be published from the data collected from manufacturers will be widely used by private and governmental organizations. They will be the foundation upon which marketing research workers will build their marketing programs for industrial goods. Salaried employees and wage earner statistics will be used, together with similar Census of Business statistics in determining the potential purchasing power of the ultimate consumer by states, counties, and other geographic areas. The 1939 *Industrial Market Data Handbook* recently published as a coöperative venture by the Bureau of Foreign and Domestic Commerce and the Bureau of the Census summarizes and digests statistics on manufacturing activity collected at a recent Census of Manufactures for the use of marketing experts.

The quantities and values of individual products which are to be collected will be widely used by industry itself in determining how much of each type of product was produced during 1939 and the amount of competing products produced. Such Government agencies as the Tariff Commission, Bureau of Foreign and Domestic Commerce, and Federal Reserve Board also make use of these product statistics in determining export-import relationships, analyzing individual industries and commodities and establishing and maintaining indices of production. The employment data collected at the Biennial Censuses are the bench marks to which the Bureau of Labor Statistics ties its monthly indices of employment.

These are but a few of the many uses to which the statistics will be put.

Reorganization of Social Statistics Project

The Children's Bureau of the U. S. Department of Labor acting upon recommendation of its Advisory Committee on Current Statistics is revising the organizations of its Social Statistics Project. The purpose of the revision is to make possible more prompt and complete publication of statistical material.

A meeting of local supervisors from 43 urban areas cooperating in the project has been announced for Decmeber 4 and 5.

The major modifications to be made in the reporting system are as follows:

1. Although the detailed report forms used in connection with the Project, together with instructions, will continue to be issued by the Children's Bureau, and although the reports submitted will be considered as property of the Children's Bureau, such reports will hereafter be checked and retained locally for use in the cooperating communities.

2. Reports submitted to the Children's Bureau will consist of only four or five items from each of the detailed schedules available in the local community. These items will be only those which are suitable for regular, current publication and periodic special articles.

3. To assist in the development of trend series, lists will be established

of agencies designated for inclusion in the respective fields. With regard to each respective field of service, only those cities will be included which can guarantee relatively complete reporting.

4. The field staff of the Division of Statistical Research will stimulate the local use of the detailed information retained with the cooperating communities.

The Social Statistics Project is maintained in the Current Reports Section of the Division of Statistical Research of the Children's Bureau. Its purpose is to develop report forms and statistical schedules and instructions for use in connection with various welfare programs, and to make available on a national scale information regarding the welfare activities of urban communities. At the present time 22 different schedules are in use. Although case statistics for a few welfare programs, such as the Works Progress Administration and various services for delinquents, are not reported to the Children's Bureau, the position occupied by these programs is to be indicated annually or biennially in an over-all financial summary. The most recent summary of this type, "The Community Welfare Picture," covering the cost of welfare programs in 29 urban areas in 1938, has recently been issued by the Children's Bureau.

Bureau of Labor Statistics, U. S. Department of Labor

Field work is in progress on three surveys of wages and hours, covering the lumber industry, the tanning and finishing of leather and leather belting and packing. The December 1939 issue of the *Monthly Labor Review* will carry articles on wages and hours in men's clothing in the South, men's robes and allied garments and neckwear. Other surveys soon to be published cover iron and steel; 21 branches of the foundry and machine shop industry; cotton garments; annual earnings in meat packing, and seamless and full-fashioned hosiery; and entrance wage rates as of July 1 in 20 industries. There is available in mimeographed form a report on the hat industry, including hats of fur felt, wool felt and straw, and hat materials.

To help meet the demand for information on price changes since the outbreak of the European war the Bureau has since early in September made a weekly collection of retail prices of 15 staple foods in 12 large cities. The prices are collected on Tuesdays and on Thursdays information on changes from preceding periods is released to the public. Early in December the Bureau began issuing a daily wholesale price index of basic sensitive commodities.

The quarterly collection of retail prices of coal and fuel oil has been supplemented by monthly collections, beginning in October, in 12 cities representing important markets. There is available in mimeographed form a compilation of rent indexes, by types of dwelling, for 32 cities from 1935 to 1939. The store outlets from which food prices are secured are being reviewed to determine their representativeness both as to furnishing prices of goods purchased by wage earners and lower-salaried clerical workers and in the light of changing distribution trends; the increasing importance of supermarkets is being given particular attention.

The revised series of wholesale prices of Portland cement, described in the notes section of the June 1939 issue of this JOURNAL, has been distributed in mimeographed form. The complete specifications for all items priced at wholesale are being assembled in a mimeographed report. These descriptions for two groups of commodities, building materials and textile products, have been completed and will be furnished on request. From the study of money disbursements of wage earners and lower-salaried clerical workers in cities with population over 50,000 in the years 1934–1936, there has been prepared a summarization of average expenditures and savings for the 42 cities combined, with separate figures for white families, Negro families, and all families.

The survey now in progress of building permits issued in the years 1936 through 1938 has been expanded to include data for 1939 for the metropolitan areas of cities with a population of 25,000 or over. Agents will also secure a list of all contractors in these areas to whom building permits were issued, together with the permit valuation, according to type of construction, of buildings within the corporate limits of each city. These figures will be related to data to be secured in the 1939 census of construction showing the value of contracts awarded, tabulated separately for the corporate limits and metropolitan areas of the cities.

Two bulletins are shortly to be published summarizing the monthly reports on employment and earnings. One will present revised indexes of factory employment and payrolls from 1931 forward, adjusted to Census levels through 1937, bringing to date the material in *Bulletin 610*. The other will bring together average weekly and hourly earnings and average hours worked per week from 1932 through 1939. Average hourly earnings and weekly hours for industry groups and all manufacturing combined are now weighted, as are the indexes of employment and pay rolls, according to the number of employees in the component industries. In three industries—fertilizers, sawmills, and soap—there is weighting also by region or by size of plant.

The report on man-hour statistics prepared from data in each biennial census of manufactures, in cooperation with the Bureau of the Census, is now completed for 1937. The present study covers over 100 industries; men's clothing, nonferrous metals, and the electrical group are among the industries included for the first time. Because of better reporting of man-hour data, it was possible to include in the sample for this study over 24,000 firms with nearly 50 per cent of the total number of wage earners in manufacturing.

A mimeographed report was issued in October showing the estimated number of workers in April 1939 who were subject to those provisions of the Fair Labor Standards Act which went into effect on October 24, 1939. The effect of the law as shown by the shifting proportion of workers in the different wage groups is to be the subject of another study.

For the first time, a study of causes of accidents in the lumber industry is to be undertaken. The survey will cover logging operations, sawmills, and planing mills. In connection with the annual study of industrial injuries for

1939, the Pennsylvania Department of Labor and Industry is cooperating with the B.L.S. in securing reports on injuries and exposure data. Along with report forms for the annual safety contest, the State Bureau of Inspection will send to employers the schedule for reporting injuries. The returned schedules will be utilized by the B.L.S.

The annual surveys of union rates of wages and hours, made as of June 1, are available for the building and printing trades. Articles have been prepared analyzing the provisions of state laws on minimum wages and requiring one day of rest in seven, on a review of state labor legislation in 1939, and on Federal laws relating to railroad labor. A special article deals with qualifications of railroad personnel, full crews, and train lengths.

The Bureau's bulletin on the organization and management of consumers' coöperatives is being revised.

Bureau of Mines

Monthly canvasses on the production, consumption, and stocks of strategic minerals have been inaugurated by the Metal Economics Division of the Bureau of Mines according to a recent announcement of Harold L. Ickes, Secretary of the Interior. Elmer W. Pehrson is in direct charge of the work under the supervision of J. W. Furness, Chief of the Economics and Statistics Branch.

This action was prompted by the need for current accurate data on certain domestic and imported raw materials to assist Government agencies as well as industry in meeting the various problems presented by the interruption to shipping, resulting from the European War. Although manufacturers have on hand fairly large stocks of strategic minerals and no immediate shortages are anticipated, nevertheless, the fact-finding program was deemed imperative at this time because the situation requires careful watching in view of the fact that acute shortages of mineral raw materials would be detrimental to the national defense and the public welfare. Commodities already included in the survey are manganese, tungsten, chromite, tin, mercury, and others may be added later.

Another investigation of the Bureau of somewhat greater magnitude will cover stocks of iron and steel scrap, a matter of unusual significance from the viewpoint of national defense. These data will be made available as the result of a survey of dealers' and consumers' stocks and the rate of comsumption of iron and steel scrap for the month of September, 1939.

The recent rise in steel activity has emphasized the need for careful watching of the situation in ferrous raw materials. Adequate data are available on iron ore and pig iron but little is known as to the present stocks of scrap.

The need for supplying this major deficiency in facts pertaining to the iron and steel industry has been acknowledged widely by leaders in industry and government, and Secretary Ickes has urged the patriotic coöperation of both suppliers and consumers in contributing accurate and prompt reports on their scrap position.

All the studies of strategic minerals have been endorsed by the Army and Navy Munitions Board, and the full coöperation of theAmerican Iron and Steel Institute on behalf of the consumers and of the Institute of Scrap Iron and Steel and the National Association of Waste Material Dealers on behalf of the dealers has been pledged to aid the scrap survey.

Minerals Yearbook, the annual publication of the Economics and Statistics Branch of the Bureau of Mines summarizing its statistical program, devoted considerable space in the 1939 volume to discussion of the strategic minerals problem. This book has wide circulation throughout the mining industry, more than 9,000 copies of the 1938 volume having been distributed. Last year's sales edition was exhausted several weeks before the current volume became available.

United States Tariff Commission

With the outbreak of the present conflict in Europe the Commission made an analysis of the "Probable effect of hostilities on United States imports." This review covered imported commodities in which the trade in recent years had a value of more than two million dollars annually, and dealt with the effects upon the United States economy of any cessation of or reduction in the present volume of imports of these goods. Both the trade and "essential materials" aspects of the imports were covered in so far as hostilities might cause dislocations in our economy or serious shortages for producers and consumers in this country. Copies of this report will be available for distribution shortly.

Because of the current interest in the future of our trade with Latin America, the Commission has undertaken a study of the present and potential trade relations of the United States with this area. Special attention is being given to the potentialities of the area in supplying United States imports, to the experience of the Latin American countries resulting from the decline in the prices of their principal export commodities during the depression, and to the effect of the decreased demand for some Latin American products as the result of the economic policies of certain other nations. Attention also is being given to the problems of competition faced in the Latin American area by United States exports as a result of the trade practices of other countries, and to those problems which may arise as a result of the present European war.

The Commission is also preparing reports on trade and trade policies of particular countries and those now in preparation relate to Germany, Italy, and Japan.

A detailed statement regarding the statistical and other work of the Tariff Commission is set forth in its *Annual Report to Congress for 1939*.

Bureau of Foreign and Domestic Commerce

Division of Economic Research. Recent releases in national income fields have included studies of incomes of Osteopathic Physicians, Dentists,

Chiropodists, and Chiropractors, in which detailed figures are presented relating net income to gross income, years of practice, education, and other factors affecting income. Revised estimates of monthly income payments were prepared for the years from 1929 to date and released in the October 1939 issue of the *Survey of Current Business*. Revised and extended estimates of state income payments and a bulletin on the monthly national series are in the course of preparation.

Two studies on the volume of capital outlays, covering plant and equipment expenditures by manufacturing establishments and outlays by state and local governments, respectively, also are in preparation. In each case, the purpose is to account for the fluctuations in outlays in terms of the various economic influences associated with them. In so far as possible this is being done, using quantitative methods.

Studies of outstanding long-term and short-term public and private debt in the United States annually for the ten years 1929–1938 are nearing completion. It is expected that new debt estimates, together with other pertinent debt information, will be ready for release sometime during the spring of 1940. The new estimates will represent a reclassification and revision of the long-term debt estimates previously made by the Division and will include corporate and individual short-term debt, a type of indebtedness not covered in earlier studies of the Division.

In coöperation with the Temporary National Economic Committee, the Division has completed a report upon the relation of productivity in the building industry to the problem of low-cost housing. The report is an interpretative analysis of the organization of the building industry and of the fundamental characteristics of the building process which result in inefficiency and waste. It contains a discussion of restrictive practices, mechanization, standardization, management methods, coordination, and emphasizes the need for scientific industrial research of a comprehensive nature.

The Division in cooperation with the Temporary National Economic Committee, also has in preparation:

(1) An investigation designated as the Structure of Industry study which includes: (a) a cross-section picture of industrial combination as revealed by Census Bureau records; (b) study of the concentration in this production of manufactured commodities, and (c) study of the product structure of a selected list of large corporations.

(2) A study relating to the source and disposal of funds for small manufacturing corporations.

(3) An investigation of the trends in the distribution and composition of individual incomes by size.

(4) A series of studies on business taxation: (a) The first will disclose size and industrial differences in the operations of the Federal corporation income taxes as revealed by *Statistics of Income* and unpublished data of the Bureau of Internal Revenue; (b) the second, based on questionnaires sent to large manufacturing and merchandising corporations, will examine the effects of

different corporate and financial policies upon the tax burden; (c) a third study will show for one thousand identical small corporations the trend of the tax burden for a decade; and (d) another study will examine the volume of tax payments other than income tax made by business enterprise in 1938.

Marketing Research Division. According to present plans the Division will, in the near future, take over and develop as a current reporting and research project various historical series on consumer installment credit which are being prepared by the National Bureau of Economic Research. The Russell Sage Foundation and the Credit Analysis Unit of the Marketing Research Division have assisted the National Bureau wherever possible in the compiling of these data, which will include monthly series covering the major retail trades selling on installment and the important cash lending agencies. It is anticipated that the National Bureau will publish the historical background material in bulletin form before the close of the year, and the Marketing Research Division will then establish facilities for the development of current reporting on a permanent basis.

The national survey of wholesale grocery operating efficiencies, being conducted by the Distribution Cost Section of the Division in coöperation with wholesale grocers' associations, is progressing rapidly. By the middle of December, the field work, which will include visits upon approximately 100 well-operated wholesale houses in the United States, will be completed.

Members of the staff will present a preliminary report at the annual meeting of the National-American Wholesale Grocers' Association to be held in Chicago next January. The final report, which it is expected will be available later in the spring, will evaluate successful practices relative to buying, warehousing, delivery, selling, and other wholesale functions.

In the Industrial Unit of the Division there is in preparation a statistical report on the Commercial Power Laundry Industry, the sixth of a series on basic industrial markets in the United States. This report will show the location and density of the commercial power laundry industry in the United States. Data by counties will include the number of laundries; detailed figures for washers, extractors, and tumblers; all types of finishing equipment; much of the special equipment such as blankets and curtains; and rough cleaning equipment. It will also show the details of equipment used in the dry cleaning department of those laundries which operate such departments. Information on motor trucks operated by laundries is also included in the report.

Finance Division. The Division is going forward on a study of the net creditor-debtor position of the United States. It is expected that for the first time estimates of foreign investments in the United States and the income therefrom will be available on a detailed, by-country basis. This project should be completed early next summer.

Federal Trade Commission

The Federal Trade Commission has in progress an inquiry into the opera-

tion and results of the so-called Fair Trade Laws now in effect in a large number of the states. These laws make possible the maintenance of resale prices by contract between manufacturer and wholesaler or retailer and between wholesaler and retailer when interstate trade is not involved. By the enactment of the Tydings-Miller Act in 1937, such contracts are made legal for interstate transactions in which the buyer is located in a state having a Fair Trade law, the contract being made subject to the provisions of that law.

Statistical data pertaining to price, cost, and volume for a representative list of nationally advertised brands of commodities which are under resale price maintenance contracts are being collected from wholesale and retail drug and grocery stores in a number of representative cities. Similar information for brands not under resale price contracts sold in competition with those that are, including private-brand substitutes for nationally advertised brands, is also being collected.

Some indication of the effects of these laws is expected to be found by comparison of the trends in price, cost, and volume of the commodities shown under the varying conditions studied.

Board of Governors of the Federal Reserve System

In the November issue of the *Federal Reserve Bulletin* there is an article describing a new series of quarterly figures replacing the monthly figures on customers' rates heretofore published. These new rates are reported four times a year, for the first half of March, June, September, and December, by selected banks in 19 leading cities on new commercial loans made to their customers. To afford a comparison between these rates and those of previous years a new set of figures has been compiled from the old interest rate reports beginning January 1928. They cover for the same 19 cities the rates that banks reported as charging customers for loans represented by prime commercial paper eligible for rediscount at the Federal Reserve banks under the provisions of the Federal Reserve Act. The series differ in that the banks reported a prevailing rate in the monthly series whereas in the new quarterly series they report the number and amount of loans made at specified rates and within various rate ranges.

Farm Credit Administration

As a part of the research program under way in the Farm Credit Administration, the Economic and Credit Research Division is undertaking studies of the problem of financing fruit and vegetable growers in coöperation with the Farm Credit district research divisions and some of the state agricultural colleges.

In order to improve the reporting service in obtaining data on farm mortgage recordings and farm foreclosure sales, a plan is being worked out to use national farm loan association secretary-treasurers in addition to voluntary

reporters. It is also contemplated that data on interest rates will be obtained periodically for mortgages recorded by each type of lender.

In order to meet more adequately the long-term loan reserve requirements of the Federal land banks, a new procedure has been adopted for determining the reserves to be set aside for losses on loans. Loan mortality and loss experience studies by areas in each district have been made by the Farm Credit district research divisions to assist the banks in determining the amount of reserves to be set aside for losses on loans.

Bureau of Agricultural Economics

The Division of Marketing and Transportation Research, Bureau of Agricultural Economics, is conducting a statistical analysis of the economic and social effects of the Food Stamp Plan which is now in operation in several cities on an experimental basis. The Bureau of Agricultural Economics and the Federal Surplus Commodities Corporation both have appointed field men who are gathering rather detailed statistical information from retailers and other kinds of dealers in the Stamp Plan cities. The study will attempt to measure the effects of the plan on food consumption, prices and costs, and margins of dealers. It will also attempt to project these findings in order to estimate the probable economic effects of a plan of this kind if it should be undertaken generally throughout the country. Such an estimate will be concerned with the probable effectiveness of such a plan in moving farm surpluses, and in providing better diets for low-income people, as well as with the probable cost of such an undertaking.

A study was also undertaken to determine the possibility of reducing costs of handling fruits and vegetables in New York City. During the past few months a good deal of statistical information has been gathered relating to the flow of these products through the market, together with information on costs at each stage. The probable costs of alternative arrangements for handling fruits and vegetables will be calculated. Within the next few months the Bureau of Agricultural Economics should have a report summarizing this material and recommending changes in the interests of efficiency.

Dr. F. V. Waugh of the Division of Marketing and Transportation Research visited the Virgin Islands in September to study the possibility of developing better market facilities. His study was confined mainly to the Island of St. Thomas, although incidental attention was also given to marketing problems on the Island of St. Croix. About three-fourths of the food now consumed on the Island of St. Thomas is imported, and there appears to be a good chance to expand local production of several kinds of food if facilities can be provided which would be more sanitary and which will make it possible to concentrate supplies and hold them in cold storage for the use of some of the large buyers on the Island, including the Marine Corps, the hotels, the C. C. C. camps, and the municipal hospital. Rough plans have been drawn up for a new food market, and the prospects now are that the market will be built during the current fiscal year.

Agricultural Marketing Service

The Division of Agricultural Statistics, Agricultural Marketing Service, conducted an experimental pre-harvest survey of the 1939 wheat crop in the Great Plains Region—from southwestern Oklahoma through Kansas, Nebraska, the Dakotas and the Red River Valley of Minnesota. Percentage of protein, percentage of moisture, test weight yield per acre, character, and a number of other plant characteristics were determined from head samples of wheat taken from a definite area, approximately 1/5000 of an acre, two from each field, selected at random within 20 and 120 paces of the road.

The routes along which the samples were taken were laid out in a systematic grid pattern in so far as possible with the length of the route in each county proportional to the land area of the county. The fields for sampling were selected every two miles of wheat frontage along these routes as measured by crop-meters attached to the cars. Three cars were used for the field work with two men to each car. The observations of the plant characteristics were made in a Central Laboratory operated in coöperation with Kansas and North Dakota Agricultural Experiment Stations. The results regarding protein, test weight and character were released weekly as market news as the harvest progressed through the season. The data are being analyzed as to sources of variability and significance of differences shown by the sample in the Coöperative Statistical Laboratory at Iowa State College.

Bureau of Research and Statistics, Social Security Board

Plans for a study of the organization for the administration of general relief in the State and local units are completed. Information for this study will be collected by the regional representatives of the Division of Public Assistance Research, working in collaboration with general relief officials. The data will relate to January 1940. This will be the second study of general relief administration to be made by the Division of Public Assistance Research. Aspects of administration covered by the study include: organization, supervision, financial responsibility, personnel, policies and standards and relationship of the general relief function to other welfare activities.

Plans are nearly completed for a study of organization for performing the statistical and research function in State public assistance agencies and of personnel engaged in performing these functions. Plans for this study have been developed under the auspices of a subcommittee of the Advisory Committee to the Division of Public Assistance Research and with the close collaboration of the American Statistical Association which is planning to stimulate similar studies in other major fields of statistical work. Representatives of the Bureau of Public Assistance and of the State Technical Advisory Service of the Social Security Board have met with the subcommittee and participated actively in the preparation of the schedules. Information concerning the organization for performing the statistical and research function will be prepared for all States by the regional representatives of the Division of Public Assistance Research. Data on personnel will be collected from

States wishing to coöperate in the study for all persons engaged in performing statistical work in the State agency. The purpose of the study is to obtain information which will enable the Division of Public Assistance Research to advise the States more effectively on organization and on desirable personnel standards for performing the research and statistical function. It is expected that the study will be conducted early in 1940.

Annual reports on the social characteristics of recipients accepted for the special types of public assistance during the fiscal year, 1938–39, have been received from all States. This year as last, three Bureau Memoranda will be issued by the Division of Public Assistance Research containing basic tables compiled from the annual reports on social data for each type of public assistance. The tables are already completed for aid to dependent children and are in process for old-age assistance and aid to the blind. In addition to the basic tables, three publications that are entirely graphic are being prepared. These will contain diagrams for each State showing the distribution of payments to recipients by dollar intervals. The distribution patterns are remarkably dissimilar and illustrate the extreme variation underlying the average payments in the different States. This graphic material should be of considerable value in understanding grant procedures. During the year, additional monographs based on the social data for 1938–39 will be issued. Two articles on the 1937–38 social data about recipients of blind assistance are in process and will be published shortly.

The Division of Public Assistance Research has prepared and is about to release a summary of the available data on general relief operations in 18 large cities for the period January 1938–June 1939. Reports were received from all cities with populations of 400,000, according to the 1930 Census, except New Orleans, and from Rochester, New York, which is somewhat smaller. The material will include tables presenting comparative statistics by months and a brief text discussion. The need for current exchange of detailed statistics of operations of large city relief agencies as an aid to administration was discussed at the meeting of the American Public Welfare Association on December 11, 1937. The matter was referred to the Joint Committee on Relief Statistics of the American Public Welfare Association and the American Statistical Association, which arranged for an initial exchange of data and requested the Social Security Board to provide facilities for continuing the collection. As a result the present reporting plan was put into operation early in 1938.

Since July 1939, State public assistance agencies have been participating voluntarily in an experimental reporting system developed by the Division of Public Assistance Research for the collection of financial statistics on expenses and sources of funds for public assistance. A summary and analysis of the reports for the last six months of 1938 were presented at the National Conference of State Directors of Research and Statistics in public assistance agencies and will appear in a forthcoming issue of the *Social Security Bulletin*. An article, "Source of Funds Disbursed for the Special Types of Public Assistance in 1938," appeared in the *Social Security Bulletin* for September

1939. Two other forthcoming articles, "Distribution of Public Assistance Funds Within States" and "Earmarking Funds for Public Welfare Purposes" will discuss present State practices in these respects and some of the problems encountered in providing funds uniformly and adequately within States.

With the publication of data for the months of April-June 1939 in the *Social Security Bulletin* for September 1939, the rural and town series was discontinued, in accordance with the recommendation of a subcommittee of the Joint Committee on Relief Statistics of the American Statistical Association and American Public Welfare Association. This project was developed when the Federal Emergency Relief Administration was being liquidated and general relief was being turned back to the States and localities. At that time, it was not certain whether it would be possible to obtain reports on general relief on a comprehensive scale. The rural and town series was intended to complement the urban series and through a sampling of rural areas to supply a basis for constructing a picture of the volume of relief in rural United States. Decision to discontinue the series was made because data for the WPA program were not available for the sample areas represented in the series and because county data on an almost nation-wide scale are available for all the programs included in the series. Discontinuance of the rural and town series does not indicate loss of interest in rural problems. The November issue of the *Social Security Bulletin* will contain an analysis of trends in expenditures for the three special types of public assistance in urban and in rural areas since January 1935.

A second national conference of State directors of research and statistics in public assistance agencies, sponsored by the Division of Public Assistance Research, was held at the Mayflower Hotel in Washington, D. C., from October 23–26 inclusive. Representatives from 40 States and the District of Columbia attended and participated in the program, developed by a planning committee of State directors, of which Emmett Welch, Director of Research and Statistics in the Pennsylvania Department of Public Assistance, was chairman. The majority of the papers were presented by State directors, and two panel discussions comprised principally of State personnel were held. The topics discussed at the conference included the following: The Statistics and Research Function in a Public-Assistance Agency, Statistics and Research and the Local Unit, Integrated Statistics at State and County Levels, Basic Records, Administrative Expenses, Standards for Periodic Publications, and Social and Economic Characteristics of Recipients of Assistance. The proceedings of the conference including the papers presented and a summary of the discussions will be available in the near future.

A dinner meeting for those attending the conference was arranged by the American Statistical Association prior to the regular monthly meeting of the Washington Chapter of the Association to which the conference members were invited.

The Division of Public Assistance Research now has available for distribu-

tion a limited number of copies of abstracts of special studies in the field of public welfare completed by public and private agencies. These will be sent to directors of research and statistics in State public assistance agencies, and, upon request, to other interested persons.

In old-age insurance the most important statistical activity at this time is the development of plans and specifications for the statistics to be obtained from the application for and payment of claims for the new types of benefits which begin in January 1940. In collaboration with the Bureau of Old-Age and Survivors Insurance, the Division of Old-Age Benefits Research has been devoting major attention to this problem. The extent and character of the statistics available to the public on this new program will be determined by the degree of success with which suitable specifications and plans can be administratively worked out.

An attempt is now being made to revise the estimates of the number of persons and the total pay rolls in various occupational groups, in order to determine more exactly the probable number of inclusions and exclusions which are likely to result from the amended coverage provisions of the 1939 Act. Another study of the 1937 wage data is nearing completion. This attempts to isolate the influence of certain factors, such as the age, sex, and color distribution of workers, which account for State differentials in mean taxable wages. The purpose of this study is to analyze the effect on wages of differences in the economic conditions of individual States.

Work on the study of family composition in the United States, which is being undertaken by the Division of Health Studies, has included more detailed analysis of family income in relation to family size, number of children in the family, number of workers, and employment status of workers. Salient findings from these studies are embodied in articles published in the *Social Security Bulletin*.

In connection with cost-of-living studies, plans have been developed to use data from the family composition study to determine the number of families that are self-sustaining, the number of borderline cases, and the number that do not have sufficient income for self-maintenance.

The extension of the studies on disability has included further analysis of foreign and domestic experience with temporary disability and invalidity insurance, and exploration of experience in countries not previously studied, whose experience may be utilized as guides for estimating the probable volume of disability in the United States and the costs of a disability insurance program.

United States Employment Service

Under terms of the President's Reorganization Plan No. 1 the functions of the United States Employment Service were transferred to the Social Security Board, Federal Security Agency. The Employment Service and the former Bureau of Unemployment Compensation of the Social Security Board were combined to form the new Bureau of Employment Security of the

Social Security Board. Further news and notes concerning activities will be found under the heading of the Bureau of Employment Security.

Division of Employment Service, Bureau of Employment Security, Social Security Board

The Division of Employment Service is continuing its activity in the development of standards and procedures designed to improve the operations of public employment offices. The change in form of organization has not interrupted the progress of studies previously instituted and new aspects of placement problems are receiving attention. The specific activities are described in the work of the several sections.

The Standards and Methods Section is primarily concerned with the development and improvement of operating practices and the furnishing of technical assistance to the administrators of State employment services in attaining and maintaining acceptable standards of performance. As a basic guide in the development of operating procedures a statement has been prepared of acceptable practices in each phase of employment office work. Due to the wide geographic, economic and industrial variations between the State employment services the statement consists of fundamental underlying principles rather than detailed operating methods. Illustrations of the manner in which the principles may be applied to specific local office problems under different circumstances are also given.

In collaboration with other units of the Bureau of Employment Security, work is being carried on in the development of a comprehensive glossary of technical operating terms. Plans are being formulated for the introduction to the operating offices of the State employment services throughout the country of the new occupational dictionary. This dictionary will contain definitions covering some 29,000 occupational titles, together with classified occupational titles.

The Occupational Analysis Section has developed further batteries of tests for measuring occupational potentialities of applicants. Tests for the following manual and production occupations have recently been completed: shirt presser, greeting card assembler, candy wrapper, candy packer, inspector-wrapper, heel trimmer, brush making machine operator, cashier-inspector, textile winder, and legger, looper, footer, boarder, and seamer in hosiery mills.

Work is in progress for developing similar selection techniques for the occupations of power sewing machine operator, order clerk, bag sewer, bottle selector, carton assembler, partition assembler, ediphone transcriber, lockstitch sewer, wirer, solderer, jewelry plier worker, and coner, spinner, transfer knitter, inspector, and pairer from hosiery mills.

The General Clerical Battery that was developed for measuring potentiality of clerical workers has been introduced for experimental use in four research centers. These centers have made arrangements to conduct follow-up studies to check the validity of the battery.

The methods used and the results obtained in various occupational studies conducted by the Worker-Analysis Unit are described in a book entitled *Occupational Counseling Techniques* soon to be published by the American Book Company, New York City.

A Special Services Section has been established in the new organization to give attention to the employment problem of certain specialized groups in the labor market. These include juniors, physically handicapped, and negroes. As a basis for further development the Junior Unit has recently completed a survey of the placement facilities for juniors in the public employment offices throughout the country and is now studying the suitability of various bases of occupational classification for juniors without work experience or of very limited work experience.

The Handicapped Unit is preparing an occupational analysis of the various fields of activity in which handicapped workers normally find employment. The kinds of jobs which ordinarily can be done by handicapped workers, the relation of handicaps to the ability of workers to fill successfully various occupations, and the identification of occupations in which wider use of handicapped workers can be made are phases of the study. A handbook covering procedures to be used in the placement of the handicapped will be prepared. The handicapped unit is actively coöperating with various organizations carrying on rehabilitation work.

The Negro Unit is actively promoting action to improve the employment opportunities of Negroes. Particularly a series of State and regional conferences on Negro employment problems has recently been conducted under the auspices of the Governors of various States.

Research and Statistics Division, Bureau of Employment Security, Social Security Board

The newly established Bureau of Employment Security, as of July 1, became responsible for the conduct of the program formerly incorporated in the United States Employment Service of the United States Department of Labor and the Bureau of Unemployment Compensation of the Social Security Board. This reorganization resulted in the merging of a large part of the work of the Division of Research and Standards of the Employment Service and the work of the Division of Research and Statistics of the Bureau of Unemployment Compensation. Mr. Collis Stocking is the chief of the Research and Statistics Division in the Bureau of Employment Security.

A major undertaking initiated by the Division, shortly after the reorganization, concerns the revision of the employment security statistical reporting program directed primarily toward an integration of employment service and unemployment compensation statistics. The tentative draft of the reporting manual, including proposed forms and instructions, has been completed and will be forwarded to research and statistics units in State employment security agencies for comment. It is expected that the revised reporting program will become effective January 1, 1940.

The most important revisions in the reporting program, aside from changes in administrative statistics designed to more adequately appraise operations, consist of the elimination of duplicate data reported previously under the separate programs, and the addition of several reports containing administrative and economic information. The revised reporting program adds contribution and wage reporting delinquency statistics, annual report of registrants according to the number of times placed in employment, and information on interstate claims showing amount of benefits and the number of weeks of unemployment compensation by liable States. Other reports will indicate benefit payments by industry and the results of experience rating (merit rating) in those States which charge benefits against individual employer accounts. The experience-rating reports will compare contribution and benefit payment experience both by industry and size of pay roll. These data will be useful not only in appraising experience-rating systems, but will also provide basic information essential to actuarial analyses. The introduction of statistical reporting of potential and actual duration of benefits, with separate reports for claimants exhausting benefit rights and for claimants whose benefit years terminated without such exhaustion, will also contribute significantly to actuarial studies. With respect to employment and pay-roll reporting, provision is made for reporting on an identical firm basis covered employment by months and taxable wages by calendar quarters, for some 70 industry groups in the Social Security Board Industrial Classification. These reports will in addition to their usefulness for employment security analyses, provide essential information to the Bureau of Labor Statistics and other agencies using employment and pay-roll data.

Further progress has been made on two statistical monographs which will probably be released before the end of the year. One monograph presents a summary of 1938 operations of State unemployment compensation and employment service programs in which tabulations of key items will be shown. The second monograph summarizes covered employment and taxable wage data for 1938 as reported by State agencies on their annual reports of coverage and contributions. The data on employment will be shown by months and wages by quarters for major industry groups. This industry information will in many instances provide bench marks hitherto not available, such as employment in the railroad industry by States. Employment and wage data for other industry groups on which scanty information is now available, such as hotels, eating and drinking places, finance, insurance, etc., will also be presented. These data will be released on a preliminary basis, and as delinquent employer contribution reports become available the original tabulations will be revised.

To acquaint those outside of the Research and Statistics Division with its current work, a report, entitled "Research and Statistics in the Bureau of Employment Security," has been reproduced. This publication describes the statistical and research program of the Division for the remainder of the fiscal year in three major fields—statistical reports, labor market and place-

ment studies, and insurance studies. Several publications in the insurance studies sector have been reproduced or are nearing completion.

Extensive amendments to State unemployment compensation laws during 1939 have made necessary the preparation of a guide to the revised laws. *A Comparison of State Unemployment Compensation Laws*, last issued in August, 1938, will present in tabular form the contents of unemployment compensation statutes as of October, 1939. This document will be available by January 1, 1940. The tabular comparison will be supplemented by a report to be issued at the same time entitled "Recent Developments in Unemployment Compensation." This study will summarize both the benefit-payment and contribution-collection experience of the States. Payments to individuals as shown by average payments will be more closely examined. The major portion of the report will be devoted to recent changes in the State benefit formulae, such as altered methods for fixing benefit eligibility, weekly benefit amounts and duration of benefits. Evaluation of the possible effects of these and less significant amendments upon workers' benefit rights will be based largely upon State research studies.

The intense interest of administrators, legislators, employers, and labor groups in the question of experience rating has prompted the preparation of a report on this subject entitled, "The Experience Rating Research and Statistics Program." It will outline several proposed experience-rating plans and the economic basis of each plan. In addition, the administration and current statistical by-products of the operation of existing State schemes will be described, with particular emphasis on Wisconsin's experience. The technique of research studies now in progress in California, Nebraska, North Carolina, and Virginia will be presented in detail.

A study of the placement activities of the United States Employment Service for the period 1933–1939 is being prepared. With a view to the expansion of placement work in private industry, it is anticipated that the study will indicate the major factors controlling the volume and character of private placements.

The study will examine the statistical reports of the Service with reference to general economic conditions, the administrative development of the Service, and various governmental programs in which the Service was involved, such as the Civil Works Administration, the Public Works Administration, the Work Projects Administration, and Unemployment Compensation. The place of the Employment Service in these programs will be analyzed, and their effect on the private placement function will be studied. The study will also include examinations of the special services accorded veterans, juniors and handicapped workers, as well as the functioning of Farm Placement Services.

Of a more general nature, examination of the length of unemployment of persons placed by the Service has been undertaken. The educational status of persons placed will also be examined. A separate section is being prepared on the occupational, age, and industrial characteristics of persons placed,

showing monthly changes in both the volume and rate of placement in these separate groups. These sections are of importance since they provide detailed information about persons placed by the Service.

Bureau of Old-Age and Survivors Insurance, Social Security Board

The experimental use of the special form for prompt notification and proof of death of social security account number holders has been extended. The States now participating in the study are Rhode Island, New Hampshire, Florida, Kentucky, Mississippi, Minnesota, and Maryland. Plans for this study were discussed at the convention of the American Public Health Association, and it is expected that the plan will be established on a nationwide basis by January 1, 1940.

Tabulations of vital and economic data pertaining to wage earners for whom old-age insurance claims were certified are now in process. Additional information required on future claims under the amendments to Title II of the Social Security Act makes necessary the preparation of new punch cards from which these data may be tabulated and tables for their analysis. Planning of these cards and tables is now under way.

The tabulation of 1937 data for individual employees covered by old-age insurance has been completed with the preparation of tables relating to the interstate migration of workers, and the whole series is now available in assembled form. Interested persons may obtain this set by addressing Mr. John J. Corson, Director, Bureau of Old-Age and Survivors Insurance, Social Security Board, Washington, D. C.

The employee tabulation for 1938, which will show the number of quarters within the year during which individual workers were employed, and the continuity of their employment in 1937 and 1938, in addition to age, sex, race, State of employment, industry and interval of earnings, is in process. Results of this tabulation will be available after the beginning of 1940.

Tables for the first quarter of 1938, showing data on the number of establishments, number of employers on the last pay roll, and total taxable wages for the reporting period, by State, size of employing organization and size of community, have been completed. A tabulation of the same items has been made for the second quarter of 1938, and tables by State and industry are now being compiled. Work has begun on the two remaining quarterly tabulations for 1938.

Division of Research, Work Projects Administration

Survey of Youth in the Labor Market. Tabulations from the study of the experiences of urban youth in a depression labor market, conducted on a sample basis in 7 representative cities, are now being completed and analyses of the basic data are being made. Plans have been drawn up for the preparation of separate reports on the following subjects: (1) the social and economic characteristics of youth in July, 1938; (2) the employment experiences of

youth; and (3) the relationship between vocational training and success in finding employment. It has been found that about 95 per cent of the youth who left school subsequently entered the labor market, and that of those who were in the labor market on July 1, 1939, approximately 20 per cent were unemployed.

Study of Sampling Procedures. A series of lectures were presented before the statistics seminar of the Graduate School of the Department of Agriculture on "The Application of the Representative Method to Social and Economic Research" by J. Stevens Stock and Lester R. Frankel, members of the staff of the Division of Research. These lectures consisted of a review of the literature since La Place's work in the early 19th century, and an exposition of some of the studies on sampling techniques made during the past three years in the Division.

Study of Urban and Rural Mexican Workers in Texas. A special report on the Mexican pecan shellers of San Antonio has been prepared. The presentation includes analyses of the pecan shelling industry in San Antonio and detailed work histories for 1938 of 512 Mexican families. One or more members of these families were employed as pecan shellers prior to the application of the Wage-Hour law; many of them became unemployed subsequently. The study reveals the extremely low incomes received by these families, the average (median) amount for 1938 being only $251 for an average of 4.6 persons.

To obtain data on Mexican migratory agricultural workers, an additional sample of 300 Mexican families was taken in Crystal City, Texas. Data comparable to those in the San Antonio study were obtained. These data are now being analyzed to show the wages and conditions of rural Mexicans and how they combined work in sugar beet, cotton, spinach and onion crops during the calendar year 1938 to earn family incomes averaging about twice as much as the amount earned by the families studied in San Antonio.

Survey of Sewing Project Women. A recent survey of the characteristics and backgrounds of 392 women, a one-third random sample of the women employed on the WPA sewing project in Pittsburgh, Pennsylvania, shows that the bulk of the women have had substantial private work experience and that at least one-third are suitable on the basis of age and education for training or re-training for regular jobs in private industry. Nearly all of the women had dependents and expected to find it necessary to continue as the main support of their families. More than half the women express a desire for further occupational training, though few were interested in training for domestic service. Most of them had sufficient previous paid work experience to justify special efforts to return them to regular industry.

Division of Statistics, Work Projects Administration

Special attention has been devoted to the problem of the disposition of inactive records in the State and local offices. A procedure providing for the

preservation of important CWA records and destruction of the remainder has been released to the State Work Projects Administrations who are custodians of such documents. Detailed procedures are being released shortly establishing standards for preservation of important WPA records. The microfilming process will probably be used rather extensively.

A new publication entitled, "Federal Work Programs and Public Assistance" is being released monthly beginning with July 1939. This bulletin contains statistics on the number of households, estimated number of persons, and earnings on each of the various Federal work programs and on Public Assistance programs, together with a brief analysis of the statistics. A monthly time series by programs for U. S. totals is given for the years 1936 through 1939 and data for the current month are shown by States. This bulletin represents a consolidation of data formerly appearing in the monthly bulletin entitled, "Analysis of Relief and Employment on Federal Work and Construction Projects" and in the monthly mimeographed release entitled, "Net Number of Households and Persons Receiving Relief and Employment on Federal Work and Construction Projects and Payments to These Recipients."

Plans are being completed for conducting a tabulation of physical accomplishments on all WPA construction projects from the beginning of WPA operations through December 31, 1939. The tabulation work will be handled entirely in State WPA offices. It is expected that reports will be available about March 31, 1940. Plans are also being developed for a new series of quarterly reports to provide similar data on project activities for non-construction projects.

Tabulations based on the special survey of the WPA winter recreation program conducted in February 1939 are now completed. Data are now available showing for each type of recreational activity the proportion of recreation leaders' total time which was spent at each specific type of recreation during the week covered by the study. Similar tabulations show the relative amount of time spent at each recreational activity by participants in supervised play activities, and the relative interest shown in each type of activity by spectators.

A general statistical summary covering the CWA program has been published under the title "Analysis of Civil Works Program Statistics." Copies are available upon request.

Office of Education

The Office of Education called a meeting of the National Advisory Committee on School Records and Reports in September to assist staff members in their study of the evaluations, comments, and suggestions from States on their use during the past two years of coöperatively evolved materials; to study recommendations for changes in financial accounting classifications suggested at two recent conferences; and to assist in planning a revision of *Office of Education Bulletin 1928, No. 24*, on uniform records and reports.

Central Statistical Board, Bureau of the Budget

Perpetual Inventory of Report Forms Used by Federal Agencies. An inventory of report and questionnaire forms used by Federal agencies during the fiscal year 1939 is now being made by the Central Statistical Board at the request of the Director of the Budget. This inventory, although somewhat less detailed than that conducted last year, will provide a useful recheck and will reveal new forms adopted in the intervening period. Each agency has been asked to report on the number and type of respondents using each form, the number of canvasses during the year, and whether or not continuing forms had been in use before January 1937. On the basis of this inventory, the Board will revise and improve its comprehensive card index of forms used to collect information from the public. This index enables the Board to keep in touch with all the statistical data collected by all Federal agencies.

By *Budget Circular* No. 351 dated November 1, 1939, the Director of the Budget has established a series of quarterly reports to the Central Statistical Board on forms adopted, forms revised, and forms discontinued from active use. Each agency has been asked to report beginning with the quarter July 1–September 30, 1939. This will enable the Board to keep its card index up to date. The Board also expects to be able to determine, on the basis of these quarterly reports, the extent of compliance with its Regulation No. 1 which requires that Federal agencies submit proposed questionnaires and report forms to it for review in advance of their adoption.

Department of Agriculture Graduate School

Two new courses in mathematical statistics are being offered this year by the Graduate School of the Department of Agriculture. In October Dr. C. Winston inaugurated "A Course on Infinite Processes." The course covers the theory of functions from the standpoint of infinite aggregates, continued fractions, point-set theory, Riemann integration, and Lebesque integration. Beginning February 1, 1940, Mr. M. A. Girshick will give a course in "Classical Probability." Probability will be approached from a historical standpoint wherein ancient, medieval, and modern concepts will be covered.

Dun & Bradstreet, Inc.

Retail Operating Ratio Survey. Four consecutive studies of this type were conducted by Dun & Bradstreet in the years 1934 to 1937 inclusive, but none has been made since. A 1940 Survey will be based on 1939 experience as revealed in the returns from a mass-mailing of more than 2 million questionnaires during the coming month. The Survey was allowed to lapse two years because previous tabulations showed that typical retail operating ratios change but slowly from year to year. However, continued active public interest in this type of information, and the possibility that changing business conditions will be reflected in the figures, have caused the present decision to produce a new model of the survey. Tabulation plans have not

yet been completed but it is expected that the published reports will be more compact and give more emphasis to interpretation of the figures than was the case in previous surveys.

Business Trend Survey. A suggestion that the revived Retail Survey, mentioned above, should replace the Business Trend Survey brought vigorous protest from a number of users who have come to rely on the availability of semi-annual estimates of inventory trends. Therefore, the two surveys are combined on a duplex questionnaire to be sent to every concern listed in the *Dun & Bradstreet Reference Book.* The character of data resulting from this survey will be similar to that published last year and will, as before, appear in a series of articles in *Dun's Review.*

Financial Ratios. Percentages and ratios expressing safe or typical interrelationships between the items on 1938 closing balance sheets were published in the November issue of *Dun's Review* for 24 wholesale and 12 retail lines and in the December issue for 36 manufacturing lines. Both sets of figures will shortly be combined in a pamphlet reprint issued as a supplement to Roy A. Foulke's "Behind the Scenes of Business."

Paint Manufacturers' Profits. A limited number of mimeographed copies are available containing the results of a special study conducted by Mr. Foulke in the paint, varnish and lacquer industry. Three years of sales and profits (1936, 1937 and 1938) are analyzed. The study is based on the experience of 213 companies, estimated to represent 69 per cent of the industry's output.

Tax Payment Survey. The projected study of regional differences in tax payments of business enterprise—as mentioned in the September issue of this JOURNAL—was carried forward only in the retailing field, since the relatively small number of cases in manufacturing and wholesaling fields made regional averages unreliable. However, the study in the retail field disclosed patterns and regional differences primarily of interest to statisticians and students of taxation. This study has therefore not been published in *Dun's Review,* but is available as a separate pamphlet, free of charge on request.

National Bureau of Economic Research, Inc.

The Universities-National Bureau Committee met at "Hillside," the National Bureau's quarters at Riverdale, on October 14. In attendance representing universities were Jacob Viner, Chicago; J. C. Bonbright, Columbia; W. A. Paton (alternate for I. L. Sharfman), Michigan; R. A. Stevenson, Minnesota; Anne Bezanson, Pennsylvania; J. S. Davis, Stanford; H. M. Groves (alternate for M. G. Glaeser), Wisconsin; Wesley C. Mitchell, National Bureau of Economic Research; the Chairmen of the Conferences on Price Research, on Research in National Income and Wealth, and on Research in Fiscal Policy; F. C. Mills, Simon Kuznets and W. L. Crum; the Director of the Financial Research program, R. A. Young; and M. A. Copeland and J. Frederic Dewhurst. In addition, J. B. Woosley, University

of North Carolina; E. H. Hoover, University of Michigan; and R. L. Kozelka, University of Minnesota, had been invited to report on localization of industry studies in their respective regions.

Mr. Mills reported that the Report of the Committee on Textile Price Research is in press and will be published as Number 2 in the National Bureau's series of Price Studies. Since the meeting, the Reports of the Committees on Price Research in the Oil and the Iron and Steel Industries have gone to press. Together they will constitute Number 3 in the series.

Dr. Kuznets outlined the progress of Conference activities under four heads:

1. *Individual reports on controversial problems.* The continued activity in this direction resulted in Volume Three of the Conference series, *Studies in Income and Wealth,* to be published early in December. This volume represents a significant departure from the first two, both because it deals more directly with measurement and because it is entirely concerned with problems of dividing national income and wealth into meaningful constituents rather than with the meaning of the totals themselves. Three major types of allocation are considered: among groups classified by size of income or wealth, among the various components of saving and expenditures, and among states. With the issuance of this volume, the Conference may for a time suspend this sort of activity.

2. *Distribution of income by size.* Some time ago the Conference initiated a survey of the available data on the distribution of income by size. The plans call for a report on each major body of data; many of these reports have already been completed and it is expected that the rest will be completed in the near future. This survey will probably be one of the principal topics of discussion at the next annual meeting of the Conference. Advisory activity in connection with studies that promise to add to data in this field was continued and extended. Connection was maintained with the Treasury-WPA study of 1936 and 1937 returns; Richard Crawford, formerly with the Department of Commerce, being attached to the study as a reporter to the Conference. The proposed income questions on the Census of 1940 were discussed at the spring meeting of the Conference, and an advisory committee set up to be at the service of the Bureau of the Census whenever called.

3. *Regional studies.* The Wisconsin and Delaware studies of income tax returns and the Minnesota Income Study have made significant progress. These studies are important both in their own right and because they contribute data valuable for broader studies of the distribution of income by size. The basic tabulations of the Wisconsin data have been completed and funds for analytical studies have been obtained. The tabulation of the 1936 Delaware data is nearing completion, and the tabulation of a sample of 1937 and 1938 returns has been started. Funds from local sources and the Rockefeller Foundation made possible this continuation of the project. The Minnesota Income Study, with which the Conference has had somewhat less inti-

mate contact, has managed to begin an exceedingly important part of its work, the field questionnaire study, despite difficulties raised by WPA regulations. Of great promise for the future development of regional studies is the interest shown by southern groups in problems of income and wealth in the South. One of the sessions of the Southern Economic Association's meeting in Charleston, November 3–4, was devoted to this topic. It has also been selected by the Southern Regional Committee of the Social Science Research Council as the topic of discussion at its two-day annual conference to be held in Chattanooga in March 1940.

4. *Income estimates from foreign countries.* For some time Professor Studenski of New York University has been engaged in a study of income estimates for various foreign countries. The Conference is now cooperating with Professor Studenski and has established a committee to review the prospective report. If the report is published in the Conference series, the committee may preface it with a discussion of problems arising in international comparisons of national income estimates.

PROGRAM OF RESEARCH IN FINANCE.—The Advisory Conference on Research in Finance held its first meeting on October 19 and 20, 1939. Approximately 55 members attended one or more of the three sessions. Papers were presented at the first session by Ralph A. Young on the consumer financing study; by R. J. Saulnier on agencies of consumer instalment credit; and by Gottfried Haberler on consumer credit and economic stability. Winthrop W. Aldrich, Wesley C. Mitchell, and Lewis W. Douglas discussed research in economics and finance in general at the second session. At the third session papers were presented by Winfield W. Riefler on the corporate bond study; by Ralph A. Young on plans for a study of changing financial requirements of American business, and by F. Cyril James on areas of needed research in finance.

The first of the National Bureau's studies of consumer instalment financing was released in October: *Bulletin 76–77*, The Statistical Pattern of Instalment Debt by R. A. Young and Blanche Bernstein. Manuscripts are being prepared on personal finance companies and their credit standards; sales finance companies and their credit standards; government agencies of consumer instalment credit; commercial banks as agencies of consumer instalment credit; industrial banks and their credit standards; consumer credit and economic stability; and the pattern of consumer debt. In addition a second Bulletin will present material dealing with quantitative measures of the amount of consumer instalment credit by types of lending institutions and by commodities financed for 1929–38.

CONFERENCE ON RESEARCH IN FISCAL POLICY.—After studying opportunities for research in the field of fiscal policy in all its aspects and at all levels of government during the last two years the Exploratory Committee on Research in Fiscal Policy has passed along its task to a continuing body which will operate under the auspices of the National Bureau of Economic Research as a Conference on Research in Fiscal Policy. From a wide range of

topics for research outlined by the predecessor committee the Conference has selected five topics to which it plans to give active attention as soon as the needed personnel and resources can be brought together.

An Analysis of Divergences between Net Income as defined for Tax Purposes and for other Purposes
The Relation of Income Taxation to Business Management Policies
Public Debt Flotation and Management with emphasis upon its Technical Aspects, the Distribution of Holdings of Public Securities, and the Relation of the Debt to the Banking System
Analysis of Changes in the Net Income-Creating Contribution of the Federal Government
An Economic Classification of Federal Expenditures

For the fifth topic a preliminary survey has already been initiated by a subcommittee working on behalf of the Conference.

The Conference is contemplating the publication of a preliminary report in which the results of the survey of the field of research in fiscal policy by the predecessor committee will be made generally available. This report is expected to include a fairly detailed listing of the more significant research problems in this field as outlined by the Committee, an indication of the existing status of research, published results in particular areas of the field, and a selected bibliography of items likely to be helpful to those who undertake research in fiscal policy.

Investigations of the Twentieth Century Fund

The Fund's study of government and the electric light and power industry has been under way for several months, with a research staff of six under the direction of Dr. Arthur R. Burns at Columbia University being engaged in the project. The survey is not primarily statistical in nature but the study of rates and costs in the industry will involve the assembly and analysis of a considerable amount of statistical data; most of it, however, scattered throughout various official and corporate reports.

The field work involved in the study of collective bargaining, which is being conducted under the directorship of Dr. Harry A. Millis, has virtually all been completed and the members of the staff are now engaged in preparing their individual industry reports. It is expected that the preparation and revision of these individual reports will have been completed by January 1940 and the completion of the final report is scheduled for the early summer of 1940. Although this survey is not primarily statistical it will involve considerable statistical presentation of historical data on the development of collective bargaining in American industry.

The study of the economic effects of short selling on the New York Stock Exchange, which is being conducted under the research directorship of Dr. Frederick R. Macaulay, is primarily of a statistical nature. Most of the statistical material in the form of tables and charts has been completed and

the work of preparing the text is going rapidly forward. Although it is impossible to predict a definite date for publication of the results of the study, it is expected that it will be completed early in 1940.

The results of the Fund's study of distribution costs appeared in printed form on September 1 under the title *Does Distribution Cost Too Much?*

Work on the study of salaries of officials of large corporations is still being held in abeyance but it is hoped that this survey will be resumed in the near future.

Preliminary consideration is being given to the initiation by the Fund of a comprehensive survey of the housing problem in the United States. It is expected that final decision on this question will be made by the Trustees of the Fund within the near future. If the study is authorized, the research work will be commenced before the end of 1939. This survey will involve extensive statistical analysis and interpretation of published data on housing conditions, building costs, etc.

European Journals and the War

The non-receipt by a subscriber of any European chemical or other scientific journal seriously needed as research material should be promptly reported to the American Documentation Institute. The Cultural Relations Committee of ADI, which coöperates closely with the Cultural Relations Division of the Department of State, is working on this problem, and hopes to be able to surmount such war obstacles as interrupted transportation, embargoes and censorship, which so grievously affected the progress of research during the last war.

The principle should be established, if possible, that the materials of research having no relation to war shall continue to pass freely, regardless of the countries of origin or destination.

Reports, with full details of where subscription was placed and name and address of subscriber, volume, date and number of last issue received, should be addressed to: American Documentation Institute, Bibliofilm Service, care of U. S. Department of Agriculture Library, Washington, D. C.

Microfilm Sets of Periodicals

The Committee on Scientific Aids to Learning, President Conant of Harvard, Chairman, has made a grant to cover the cost of making a microfilm master negative, on the most expensive film, of sets of volumes of scientific and learned journals. This permits the non-profit Bibliofilm Service to supply microfilm copies at the sole positive copy cost, namely 1 cent per page for odd volumes, or a special rate of ½ cent per page for any properly copyable 10 or more consecutive volumes. The number of pages will be estimated on request to: Bibliofilm Service, care U. S. Department of Agriculture Library, Washington, D. C.

CHAPTER ACTIVITIES

The Albany Chapter

Forty members and guests were present at the opening dinner meeting of the 1939–40 season, held on October 16. Chapter President Charles M. Armstrong presided, with the introduction of speakers by Professor E. H. Van Winkle of Rensselaer Polytechnic Institute.

The subject, "Problems and Techniques Involved in Forecasting in State Departments," was discussed by three speakers, with emphasis on problems of current importance in their own agencies. The formal talks were followed by a general discussion.

Chester B. Pond, Department of Taxation and Finance, pointed out a number of difficulties involved in forecasting revenues to be received by the State. The executive budget for New York, for the fiscal year beginning July 1, 1940, will be presented to the Legislature in January, 1940. When presenting the budget, the Governor is required by law to accompany it with an estimate of the income to be received from taxation and other sources which can be used to meet it. This requires forecasts for a period ending 18 months after the presentation of the budget. Comparisons made between the forecasts of tax yields and their actual out-turn for earlier periods indicated a degree of accuracy ranging from close agreement to wide discrepancy in the various categories, with personal income taxes relatively close and stock transfer taxes relatively far from the forecasts, and others in intermediate positions.

Edward T. Frankel, Department of Social Welfare, described the methods used in forecasting the amount of State expenditures to be expected for old-age pensions, home relief, and other related forms of relief for which the State provides funds alone or jointly with local governmental units or the Federal government. A relatively satisfactory degree of accuracy has been attained in these forecasts. Complicating factors are the variations in W.P.A. wage payments and other Federal contributions from time to time, as well as changes in the general economic situation. These forecasts, both on an annual and a monthly basis, are of particular importance in budget making and in general state finance.

Charles M. Armstrong, Division of Placement and Unemployment Insurance, Department of Labor, discussed the problems connected with forecasting the payments of unemployment benefits, and the placements of workers through the public employment agencies under varying economic conditions.

In all cases, the speakers made clear that many factors are involved in making forecasts in these important State governmental fields. As yet, techniques are not fully developed. A detailed knowledge of the particular fields and a sound understanding of economic phenomena in general, are a necessary accompaniment to the use of the more highly specialized statistical procedures.

The Boston Chapter

Members of the Chapter met informally with Mr. M. W. M. Yeatts, Census Commissioner Designate in charge of the 1941 Census of India, at Harvard University on July 5, 1939.

The Chapter is sponsoring with the Association the first of the Centenary Celebration meetings, to be held in Boston on November 27, the Association Centenary Anniversary date. The officers of the Chapter are serving as the committee on arrangements for this meeting.

The Chicago Chapter

The opening meeting for the 1939–1940 season was held on October 24. Oskar Lange, Associate Professor of Economics at the University of Chicago, and Research Associate at the Cowles Commission for Research in Economics, delivered an address on "The Economic Problems of the European War," followed by a general discussion period.

The Cincinnati Chapter

The first fall meeting of the Cincinnati Chapter was held at the University of Cincinnati on October 19. L. M. Welsh, of the Procter and Gamble Company, presented the many problems connected with the effectiveness of radio advertising from the advertiser's point of view. One of these problems, the location of the listeners, is being examined by Mr. Welsh. His paper, "The Measurement of Radio Coverage," included a discussion of the advantages and disadvantages of methods which are used to measure the territory covered by radio broadcasting stations. These methods are signal strength maps, market surveys, mail surveys, and replies to "radio offers." Possible and observed errors of all methods were mentioned. In conclusion, Mr. Welsh exhibited coverage maps of certain broadcasting stations showing unique patterns or characteristics.

Douglas E. Scates, who was District Representative and Secretary of the Cincinnati Chapter last year and now with Duke University, was present for the meeting.

The meetings of the Ohio Conference of Statisticians to be held at Ohio State University on November 10 and 11 were announced.

The Cleveland Chapter

The first meeting for the season of the Business Statistics Section of the Cleveland Chapter was held on September 25. W. T. Diebold of The Ohio Bell Telephone Company was chosen as Chairman for the ensuing year, Robert L. Smith of the Cleveland Federal Reserve Bank, as Secretary. The meeting was devoted to a forecast of the Federal Reserve Board's index of industrial production.

On October 31, the group listened to a talk by Fred Sterbenz, Foreign Affairs Editor of the *Cleveland Press*, on "The Effectiveness of the British

Blockade." Mr. Sterbenz stated that the present war so far is not what was expected. A military stalemate exists. One side or the other may decide, however, that it can win by launching a vigorous attack. The British hope through their blockade to bring about a collapse of the German economic system or to cause a revolution within Germany. So far, the Germans have been unwilling to resort to strong military action hoping instead to destroy the English navy and the merchant marine.

At present, the German economic position, is not as good as in 1914. The geographic position is better. All the continent is not involved in this war. Germany's ability to withstand the blockade depends upon her ability to manufacture goods for export, since more than half of her normal export market is still available, even assuming a 100 per cent effectiveness of the British and French efforts.

Commenting on the hope that the blockade may force a collapse of the German economic system or a revolution, Mr. Sterbenz saw little likelihood of such a development, stating that the Nazi system might even survive a military defeat. He cited the Russian regime and the effectiveness of the Gestapo to support that possibility.

In talking of the German effort to starve Britain, the speaker, stated that if the Germans have been doing all they can so far, the U-boat campaign is a failure. We do not know the effectiveness of bombing raids. He concluded that the Allies cannot win by economic measures alone. Success will probably have to come by forcing Germany to spend more goods than she can import. He stated that American business may be disappointed in war buying if no vigorous military action is undertaken.

The Columbus Chapter

The October meeting of the Columbus Chapter was held on October 18. Thirty members were present and enthusiastically took part in the agenda, which included adoption of a new Constitution, election of officers, and a discussion of the statistical background of the Bigelow Amendment.

The officers for the current year are: Edwin L. Smart, President; Paul J. Daugherty, First Vice-President; John Hart, Second Vice-President, and Mrs. Verna Thomas Livesay, Secretary-Treasurer.

In the discussion, Dr. Arch Schultz described the methods and evaluated the data which had been used in making estimates of costs which would accrue to the people of Ohio should the Bigelow Amendment be passed. It becomes apparent as the bill is studied that it is cleverly written in order purposely to be ambiguous. In view of this situation, Dr. Schultz felt it advisable to use the maximum estimates of cost, since he felt that it is entirely possible that the courts would so decide should they be asked for an interpretation. In the process of making his estimates, he found that available data are not only scanty but of little use for the purpose of providing bases for estimating old-age pensions. Many data which are required for the problem simply do not exist.

Following Mr. Schultz's discussion of the costs of the old-age pensions, Mr. John Hart discussed the problem of estimating the income as described by the bill, which is proposed to cover the costs. He also made it plain that ambiguity in the wording of the bill makes it impossible to clearly interpret the importance of the proposed new taxes. He also indicated that the present tax structure does not provide a satisfactory basis for estimating income aid under the new bill. In any case, the total proposed income would fall $200,000,000 short of meeting the need. An enthusiastic discussion with well over half of those present taking part followed the presentation. It is obvious that the controversial aspects of the proposal explains the extent of participation, but the nature of the questions asked indicates a lively interest in the statistical problems involved.

The Detroit Chapter

A regular meeting of the Detroit District Chapter was held on October 26. Vice-President Oliver Baker presided in the absence of the President.

The meeting was devoted to a discussion of the possibilities for developing standards for statisticians. The discussion resulted in a motion to request the national Association to conduct a poll of the membership in order to determine what their concept of a statistician is and what standards they believe should be established for professional membership.

A Committee on Population Statistics was appointed consisting of C. C. Van Vechten as Chairman, John R. Stewart, and W. G. Bergman. The Committee will first concern itself with an estimate of Detroit's present population.

The Harrisburg Statistical Society

The first meeting of a series planned for the 1939–40 season by the committee on State Statistics was held on October 9, 1939. The discussion was conducted as a "statistical clinic" for the examination of the adequacy of state statistical data. Special attention was given to problems and "blind spots." The Committee consists of the following members: Harry Hoyle, Chairman, Mrs. Helen Eckerson, Henry Van Pelt, Willis Wissler, and Robert P. Wray.

The San Francisco Chapter

A meeting of the Chapter was held on August 24, 1939. Russell A. Kent, Vice-President, Bank of America National Trust and Savings Association, discussed the "Factors Which May Contribute to the Continuation of Low Interest Rates." W. Leonard Crum, Professor of Economics, Harvard University, analyzed the "Factors Which Indicate an Upward Long Run Trend of Interest Rates."

The Washington Statistical Society

The first meeting of the Chapter for the current year was held on October 24. The subject for the evening's discussion was "Economic Aspects of War." E. Dana Durand, Tariff Commissioner, presided.

M. Joseph Meehan, of the Bureau of Foreign and Domestic Commerce, spoke on "The Business Situation, World War and Now"; A. F. Hinrichs, of the U. S. Bureau of Labor Statistics, discussed "Wartime Governmental Control"; and Herbert Stein, of the Federal Deposit Insurance Corporation read a paper on "Problems of War Finance."

NEW MEMBERS

Abelson, Milton, Assistant Business Specialist, Department of Commerce, Washington, D. C.

Andersen, C. T., Assistant Director of Research, Detroit Public Schools, Detroit, Michigan

Aristorenas, José T., Chief, Division of Population, Commission of the Census, Manila, Philippine Islands

Ballard, Dr. Margaret L., Assistant Economist, Bureau of Home Economics, Department of Agriculture, Washington, D. C.

Batt, William L., Jr., Economic Analyst, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C.

Bennett, Edward J., Regional Supervisor, Research and Records, Work Projects Administration, New York City

Birnbaum, Lillian, Supervisor of Research, Work Projects Administration, Columbus, Ohio

Brier, Glenn W., Junior Statistician, Department of Agriculture, Washington, D. C.

Bronson, D. C., Assistant Actuary, Social Security Board, Washington, D. C.

Burroughs, John A., Associate Economic Analyst, Division of Manufactures, Bureau of the Census, Washington, D. C.

Cleveland, Earle A., Junior Statistician, Research and Statistics Section, State Department of Employment, Sacramento, California

Craf, John R., Auditor, Tubize Chatillon Corporation, New York City

Dyer, Edith M., Junior Economist, Division of Family Economics, Bureau of Home Economics, Department of Agriculture, Washington, D. C.

Edwards, Archie C., Chief, Statistical Division, Civil Service Commission, Washington, D. C.

Embree, Jean, 403 Petigru Street, Greenville, South Carolina

Fiedler, R. H., Chief, Division of Fishery Industries, Bureau of Fisheries, Department of Commerce, Washington, D. C.

Foytik, Jerry, Teaching Assistant in Statistics, University of California, Berkeley, California

Frank, Charles H., Statistician, The Great A. & P. Tea Company, Cleveland, Ohio

Glaser, Oscar P., Assistant in the Office of Coordinator of Statistical Projects, Work Projects Administration, New York City

Glass, Henry E., 1120 Brighton Beach Avenue, Brooklyn, New York

Goldsmith, R. W., Assistant Director, Trading and Exchange Division, Securities and Exchange Commission, Washington, D. C.

Graham, S. Stanley, Associate Professor of Agriculture, Sam Houston State Teachers College, Huntsville, Texas

Haase, Robert T., Junior Social Science Analyst, Social Security Board, Washington, D. C.

Hengren, Raymond E., Associate Financial Economist, Securities and Exchange Commission, Washington, D. C.

Hodrus, W. F., Controller, International Textbook Company, Scranton, Pennsylvania

Hughes, Thomas D., Assistant Controller, Haddon Press, Inc., Camden, New Jersey

Klein, Lucy M., Assistant Statistician, Colorado State Department of Education, Denver, Colorado

Koob, Harry F., Assistant Research Analyst, Work Projects Administration, New York City

Larson, Olaf F., Leader, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, Department of Agriculture, Amarillo, Texas

Leahey, T. F., Associate Economic Analyst, Treasury Department, Washington, D. C.

McCorkle, I. B., Director of Research Laboratory, National Tube Company, Pittsburgh, Pennsylvania

Merriam, Malcolm L., Chief, Credit Analysis Unit, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Miller, Kenneth E., Price Analyst, Commercial Research Division, Armour and Company, Chicago, Illinois

Neal, T. Ellison, Statistical Clerk, Farm Credit Administration, Washington, D. C.

Negaard, O. A., Research Staff, Central Statistical Board, Washington, D. C.

Parkin, Norman C., Sales Engineer, Norris & Elliott, Inc., New York City

Perlo, Victor S., Staff, Brookings Institution, Washington, D. C.

Potter, Allen R., Staff Associate in Charge of Research and Statistics, State Department of Social Security, Olympia, Washington

Randall, E. F., Economist, Central Statistical Board, Washington, D. C.

Reinboth, John F., Statistical Engineer, Statistical Department, Commonwealth Edison Company, Chicago, Illinois

Robertson, Jeff A., Kansas Commissioner of Labor, Topeka, Kansas

Rosen, Harold, Research Staff, Brookings Institution, Washington, D. C.

St. John, John B., Chief, Actuarial Section, Bureau of Old Age Insurance, Social Security Board, Washington, D. C.

Sanderson, Fred H., Research Associate, Harvard University, and Research Assistant, Department of Agriculture

Schwartz, Harry, Student, Columbia University, New York City

Skirrow, John Edward, Executive Assistant, Standard Oil Company of New Jersey, New York City

Steffes, Robert B., Assistant Statistician, U. S. Bureau of Labor Statistics, Washington, D. C.

Taylor, Clayton V., Examiner of Statistics, Civil Service Commission, Washington, D. C.

Temple, Alan H., Statistician, National City Bank of New York, New York City

Weese, Ralph S., Associate Economic Analyst, Home Owners' Loan Corporation, Washington, D. C.

Wolohan, Eugene C., Chief, Transportation Equipment Subsection, Division of Manufactures, Bureau of the Census, Washington, D. C.

Woolley, Elliott B., Beneficiary Examiner, Railroad Retirement Board, Washington, D. C.

Wright, Mrs. Kathryn R., Associate Social Science Analyst, Temporary National Economic Committee, Washington, D. C.

CHARLES FERRIS GETTEMY

Charles Ferris Gettemy, a member of the American Statistical Association since 1907, elected a Fellow in 1914, and President of the Boston Chapter of the Association 1929–1930, died at his home in Boston on October 5, 1939. He was born in Chicago, Illinois, March 12, 1868. He attended Knox College, receiving the A.B. degree in 1890, and the A.M. degree in 1893, and was a member of Phi Beta Kappa and Beta Theta Pi. After graduation at Knox College he entered the senior class at Harvard College, where he graduated with the A.B. degree in 1891.

After his graduation from Harvard, Mr. Gettemy entered newspaper work, as Washington correspondent for the *Boston Advertiser* and later for the *Boston Record*. In 1899 he joined the staff of the *Boston Herald* as political editor, holding that position until November, 1905, when Governor Curtis Guild of Massachusetts appointed him as his secretary. In 1907 he was appointed Director of the Massachusetts Bureau of Statistics by Governor Guild, which office he held until July 11, 1919, when he became Assistant Federal Reserve Agent at the Boston Federal Reserve Bank, serving in that postion until his retirement in 1937.

While Director of the Massachusetts Bureau of Statistics, he reorganized several branches of its work and developed a system of uniform municipal accounting, under State direction, which has proved very effective. The decennial cenuses of Massachusetts in 1905 and 1915 were taken under his direction. The census in 1905 was very comprehensive, and the reports were issued in four volumes: "Population and Social Statistics," "Occupations and Defective and Delinquent Classes," "Manufactures and Trade," and "Agriculture, the Fisheries, and Commerce." The Report of the Census in 1915 included five parts: "General Introduction and Population Tables," "Composition and Characteristics of the Population," "Nativity, Color or Race, Illiteracy, Political Condition, Ages, and Conjugal Condition," "Occupations," and "The Census of Fisheries and Commerce and Appendices."

During the World War, Mr. Gettemy, in addition to his official duties, was Director of Military Enrollment for Massachusetts under the Selective Draft Act, 1917. During the years 1911–1919 he was Chairman of the Massachusetts Homestead Commission.

Among the many official reports on industrial statistics and municipal accounting written or edited by Mr. Gettemy were the following: "The Cost of Municipal Government in Massachusetts"; "Plan for a Uniform Classification of Receipts and Payments for the Cities and Towns of Mas-

sachusetts"; "History of the Massachusetts Bureau of Statistics,1869–1915," published in 1915; "The Work of the Several States of the United States in the Field of Statistics" (a chapter in *The History of Statistics, Their Development and Progress in Many Countries,* commemorating the Seventy-fifth Anniversary of the American Statistical Association, published in 1918). Outside of the field of statistics, he was the author of *The True Story of Paul Revere* (1905) and *Memoir and Genealogy of Sylvannus Ferris* (1935).

In the field of statistical research Mr. Gettemy was diligent, thorough, and intellectually honest. In all respects he honored the statistical fraternity, of which, for a period of over thirty years, he was a prominent and zealous member. He is survived by his wife, Mrs. Bertha Cheney Gettemy, and his daughter, Mrs. Catharine E. Richardson of Tenafly, New Jersey.

ROSWELL F. PHELPS

BOOK REVIEWS

GLENN E. MCLAUGHLIN
Review Editor

Scientific Social Surveys and Research, by Pauline V. Young and Calvin F. Schmid. New York: Prentice-Hall, Inc. 1939. xxix, 619 pp. $3.00.

This work represents a painstaking and, on the whole, successful attempt to produce a superior introductory text. Among the features designed to stimulate student interest and help the teacher are readability of substantial contents, photographs of prominent social surveyors and of social situations, sets of study questions, and excellent bibliographies.

Comprehensiveness is the chief fault of the text because it prevents an adequate treatment of some of the subjects. For example, Dr. Young's valuable historical summary of social surveys could have been more critical in appraising the various examples from the standpoint of (a) degree to which they had a clearly stated objective, (b) degree to which they achieved that objective, (c) net contribution of each survey to science, to social work, or to propaganda, (d) their efficiency and economy, i.e., whether the same or superior results could have been secured through less effort, and (e) many other tests which our extensive experience with surveys has suggested. Perhaps Dr. Young was wise in avoiding such controversial subject matter in an elementary text. Perhaps she desired to leave this function to individual teachers. Both are defensible reasons. However, our textbooks on this subject should begin to introduce some kind of critical standards. S. C. Dodd's *A Controlled Experiment in Rural Hygiene in Syria* deserved mention in this part, at least in the bibliographies.

The most conspicuous example of the attempt to cover too much territory occurs in Part II. The discussion of sources, the problem of field observation, schedules and questionnaires, interviews, and related matters clearly belong in a text of this kind. But Dr. Schmid's effort to summarize in 62 pages the entire content of the first course in statistics undertakes too much. In spite of its excellence, the chapter on statistical techniques will, I fear, only cause confusion. Introductory students need elaboration rather than summarization. The chapters on graphs and ecology—also admirable summaries—are less questionable in a text of this kind. I regret, however, that the conventional classification of research methods as case study, statistical, ecological, etc., is retained. Clearly these are not mutually exclusive, and their assumed independence by many students leads to much unprofitable controversy. This is not to imply that the present text is given to such controversy. I merely wish the interrelationship of these methods had been more fully expounded.

Part III is devoted to methods and techniques that have been employed in studying culture groups, institutions, and communities. The lists of questions as to what to look for in such projects will be very useful to many students. Part IV treats problems of organization and analysis of data. This reviewer would have placed Schmid's chapters and perhaps some others in this part, as indicating briefly the subject matter of the next course. In fact, I wish Dr. Schmid had devoted himself to a much needed text on social statistics, giving special attention to the relation of this tool to the methods and materials so ably assembled and discussed by Dr. Young. A third volume on advanced statistics and sociometric scales would then complete for students of social phenomena an outline of needed basic training. I earnestly commend these further projects to prospective writers in this field.

It may seem ungenerous to devote so much space to criticism of a text, the generally high quality of which I recognized at the outset. If so, it should be remembered that only a good book is worth critical reading. For this reason also I may mention a few typographical errors (pages 168, 179, 181, 273, 285, 291) of which only two will give the student trouble. In the formula in Table II (page 273) the letter "l" should be substituted for the numeral "1." In the formula at the top of page 291 the circumflex has been omitted from the second "X."

GEORGE A. LUNDBERG

Bennington College

Some Notes on Least Squares by W. Edwards Deming. Washington, D.C.: The Graduate School, Department of Agriculture. 1938. iv, 181 pp.

One reads in the preface of this brochure "The assumption is that the reader knows when he needs to use least squares and when he should not, that is, when the question can be answered at all. . . . The material presented here may be regarded purely as an exposition on the principle and method. . . . I have tried to stress points that have seemed inadequately covered or incorrectly pictured by previous writers." The author has been faithful to these guiding precepts. The first part treats some simple problems in curve fitting: The mean of n observations of equal weight; the mean of weighted observations; the weighted mean of a set of samples in which observations have the same weight; the mean of a set of samples in which the precision of observations differ from sample to sample; the estimate of variance of observations of unit weight as based upon external consistency and upon internal consistency of the data, and the comparison of these two estimates.

The next class of problem deals with the slope of a line that is known to pass through the origin: The case of the y-co-ordinate subject to error and x

free of error; and the case of the x-co-ordinate subject to error and y free of error. The latter case is one that is "inadequately covered" by previous writers, at least by those whose work is meant directly to aid the practical statistician. Of outstanding value to the research worker is the splendid treatment of weights of functions.

The second part, dealing with more complicated problems, introduces the author's symbolism, out of which he builds up the general solution of problems in least squares. This part is amplification largely of Dr. Deming's own work and is rather heavy for the nonmathematician. Yet the generality of the treatment establishes the fact that "the principle of least squares applies exactly the same whether there are or are not adjustable parameters in the problem. This fact has been woefully overlooked. Critics of least squares have on more than one occasion insisted that least squares was reasonable enough in the problems of adjustment arising in surveying and astronomy, but that it is illogical, equivocal, and unjustified in curve fitting. Statements such as this arise from confusion and misunderstanding, for there is no distinction between the two problems" (page 42).

The third part deals with the application to curve fitting. After a distinction between "true," "observed," and "calculated" points, the adjustment of observations and the geometry pertaining thereto are discussed simply and clearly. This is followed by systematic procedures for setting up the normal equations in five steps, and the solution by way of the reciprocal matrix leading to the parameters, their standard errors, standard errors of linear functions of them, and finally to the confidence belt associated with the curve.

The research worker in the biological sciences will find much that is new to him and more that is treated in unfamiliar fashion. Of direct and immediate help are the exercises and notes on formation of normal equations for various functions. The study of these should incite the nonmathematician to nibble frequently at the theoretical treatment of the general case. The reward is stated on page 103: "By the procedure here explained for the formation of table 2, whence the normal equations are to be set up, the solution . . . is *unequivocal*. That is, it does not matter in what form the equation to be fitted is written. If one had, for example, $y = ae^{bx}$, he could put the same equation in the form $ln\ y = ln\ a + bx$ . . . . The point I am making is that when the normal equations are correctly made up, they will *yield the same results from any form of the fitted equation* to within higher powers of the residuals."

The brochure is a landmark in the development of least squares and the kind which will be cited frequently in "popularized" treatments in the next decades. It is the hope of the reviewer that Dr. Deming will set himself to the task of producing an expanded edition.

F. X. SCHUMACHER

Duke University

Principles of the Mathematical Theory of Correlation, by A. A. Tschuprow, translated by M. Kantorowitsch. London: William Hodge and Co., Ltd. 12/6. New York: Nordemann Publishing Company, Inc. $3.75. x, 194 pp.

This is a very accurate translation of a very good book, originally published by Teubner in 1925. One can have only a slight objection to the translation of the title. "Principles of Mathematical Theory" . . . suggests something of the kind of the Russell's "Principia," with a tendency towards all imaginable rigour, prepared for specialists and certainly without any omissions of the details because of their mathematical difficulty. Actually, the content of the book is very different and conforms perfectly with the original German title "Grundbegriffe und Grundprobleme der Korrelationstheorie." Being a revised version of several lectures delivered by the author in the the actuarial seminar at the University of Oslo, the level of the book has in mind an unsophisticated practical statistician with the knowledge of only a very limited amount of mathematics.

Books on statistics, on the same level of difficulty, appear on the market in great quantities every year. The book by Tschuprow differs from them very substantially, in that it deals mostly with clarification of the basic conceptions of statistics in general and of the theory of correlation in particular, while leaving the arithmetical technicalities out of the picture. The author is interested with the question "why" rather than with "how." This book is on "statistical theory"—as far as it is possible to present in an elementary form—and not on "statistical methods." As such, it may be highly recommended to all those students of the subject who managed to learn the "methods" but are tired of applying them without any clear understanding of their logical background. Owing to a great scarcity of similar books at present, there is little doubt that the book under review will be quickly appreciated. We can only regret that it was written some 15 years ago and consequently could not contain more recent developments.

Starting with the conceptions of causal relationship and of correlation, the author introduces the ideas of the random (or stochastic) variables and of their frequency distribution. These considerations are of a general character, not limited to the normal law. The frequency distributions are characterized by various constants, the nature of which is clearly explained. Next comes the chapter on estimation. In conformity with what was known at the time and also with the limitation on mathematical means, the author describes the point of view of what is now known as the unbiased or the best unbiased estimates of the unknown perimeters and gives a number of useful formulae related to the question. The last chapter, on object and value of correlation measurements, contains the description of some successful practical researches.

J. NEYMAN

University of California

Committee of Statistical Experts, Report to the Council on the Work of the Eighth Session. 10 pp. $0.15.

Housing Statistics, A Minimum Programme of Housing Statistics drawn up by the Committee of Statistical Experts. 14 pp. $0.20.

Indices of Industrial Production, Report drawn up by the Committee of Statistical Experts. 16 pp. $0.20. Geneva: League of Nations. New York: Columbia University Press. 1939.

If significant data could be obtained for each of several countries on a comparable basis, certain important international questions might be solved more easily. The League of Nations is performing a valuable service in its attempt to get these data on such a basis. The report of the Committee of Statistical Experts, dated April 27, 1939, summarizes work undertaken or suggested on the following problems: I. Housing Statistics; II. Indices of Industrial Production; III. Indices Showing Variations in Quantum and Prices of International Trade; IV. Application of the Revised Minimum List of Commodities for International Trade Statistics; V. Statistics of the Gainfully Occupied Population; VI. Timber Statistics; VII. Banking Statistics; VIII. Miscellaneous Questions, including problems to be taken up in the future, such as Balances of Payments and Building Activity, Costs and Prices.

Items IV, V, VI and VII contain a brief summary of the Committee's attempt to set up a "minimum programme" for the compilation of data on the respective topics. There is a short discussion of the reactions of the important countries to the plans suggested. Thirty-one countries have published or are planning to publish international trade statistics in accordance with the *Minimum List,* the grouping of the imports and exports set up by the Council. Only 17 countries have agreed to publish statistics of gainfully employed population according to the Committee's "minimum programme," and only 11 have agreed to the plan for timber data. The Sub-Committee on Financial Statistics has not completed its work of drawing up recommendations on banking statistics.

The Appendices to sections I, II, and III present the difficulties involved in obtaining a minimum amount of desirable information and suggest methods of setting it up. For example, one of the major problems in the housing study was to give standard definitions for: (1) the room, (2) the dwelling, (3) the household, (4) the occupants. After suitable definitions were reached it was possible to suggest methods for presentation of the data.

The Appendix on Industrial Production is divided into three parts. Part A explains the object and meaning of the indices and includes two important assumptions. The Committee's recommendations "start from the assumption that complete production statistics are available at intervals, or that, at least for weighting purposes, data similar to those which are generally obtained by such censuses can be approximately estimated." The Committee assumes also that "indices of industrial production are intended, in prin-

ciple, to measure changes in physical volume of industrial production during a given period." Part B gives the branches of industry to be included in the index and their groupings. Part C sets up actual formulas for the measurement of quantitative changes in production.

Appendix III defines a quantum index as a "weighted index of quantity relatives, indicating the changes in the value of trade after the elimination of the effect of price changes" and restricts its recommendations on price to "price indices calculated with a view to the analysis of trade movements." The prices used are average unit values. A complete technical discussion of the computation of the annual indices is included.

FRANCES V. SCOTT

Harvard University

Truth in Accounting, by Kenneth MacNeal. Philadelphia: University of Pennsylvania Press. 1939. xvii, 334 pp. $3.50.

The author finds prevalent accounting conventions open to numerous serious objections. Part of these defects are inherent in current procedures; some arise from negligent or incompetent reading of accountants' reports; and others are due to misbehavior of those who have continuous access to information about a concern's holdings. His "indictment" is, in the reviewer's opinion, the best feature of this vigorous, forthright book.

To rid accountancy of these objections the author proposes to value assets at their "economic values," to list liabilities at their par values, and to measure profits (losses) by increases (decreases) in net wealth. Numerically, he puts "economic value" equivalent to market price or imputed market price in an "acceptable" market. To be "acceptable" the market must be at once competitive, free, broad, and active. If such a market is wanting, he proposes means of imputing such prices and, in the case of certain items, of scaling down such prices by way of allowance for depreciation. He seems to regard such a procedure as uniquely correct regardless of the erratic and extreme amplitudes of price fluctuation to which such markets are subject and even though the actual market in which a concern operates falls far short of being "acceptable."

In numerous places he expresses the view that "acceptable" markets exist for many commodities and remarks (page 179) that "Civilization seems to be trending inexorably toward the creation of more and more free and competitive markets where true economic values obtain. . . ." Within the author's expanded definitions, doubt of these propositions may be entertained. And even in such markets, careful students of actual prices speak of the prices of a wheat (and of wheats) rather than of "*the* price" of wheat. To them a particular lot of cotton is not just cotton. No estimate of the position of the zone of cotton prices in the absence, say, of the frozen "loan stock" in the United States could rise above the level of guesswork.

In price imputation the author gives much space to replacement cost but gives scant attention to the cost analysis necessary to a determination of usefulness equivalent to that of substitutes. Moreover, truth may be both expensive and useless. One may pay too much for estimates of present replacement costs, especially if no early replacements are contemplated.

In a word, the ancient precept, "Read not to believe nor to contradict but to weigh and consider," is especially in point with respect to *Truth in Accounting.*

JOHN B. CANNING

Stanford University

World Production and Prices 1937–38. Geneva: League of Nations, Economic Intelligence Service. New York: Columbia University Press. 1938. 137 pp. $1.25.

This volume of the Economic Intelligence Service of the League of Nations sets out to review the interrelationships between world production of raw materials and manufactured goods, employment, and prices. The exposition is designed to explain the changing levels of production, employment, and commodity prices in different countries.

Such an exposition depends upon the use of series for each nation that are comparable. Comparability requires that price data refer to identical articles, production data be reported in similar physical units, and some common ground be found for reconciling the divergent concepts used in enumerating employment and unemployment. Selecting usable series from the wilderness of published statistics and making estimates to fill in the gaps is only the beginning of the difficulties. There remains the problem of organizing the data to throw light upon the causes of divergence between the various national series.

The difficulties encountered in this country with censuses of unemployment and the differences among employment estimates, to cite only one field, should raise doubts about the summation of various national data to construct world-wide series on employment and unemployment. In view of the confusion of concepts and the inadequacies, even absolute blank spots, in the basic information, it is safe to say that the Economic Intelligence Service of the League of Nations in attempting to trace world interrelationships between production, employment, and prices, is faced with overwhelming obstacles.

Athough the goal prefacing this volume is an impossible one, the task is so important that it deserves all the energies that are directed towards its attainment. It is hardly fair to question the comparability of the series aggregated into world indices or to point out that the data actually used are far more limited in scope than the sweeping title indicates. For those whose interest in statistics is met by the presentation of national indices drawn up

in different countries for different purposes and cumulated into orderly tables of world-wide aggregates, the international data here collected will prove a convenient source of reference.

EDWARD B. HINCKS

Central Statistical Board

An Econometric Approach to Business Cycle Problems, by J. Tinbergen. Paris: Hermann & Company. 1937. 73 pp. 18 frs.

Statistical Testing of Business-Cycle Theories, Volume I: A Method and Its Application to Investment Activity, by J. Tinbergen. Geneva: League of Nations, Economic Intelligence Service. New York: Columbia University Press. 1939. 164 pp. $0.90.

Both of these monographs are concerned with the development of methods for testing the strength of factors accounting for business cycles. Multiple correlation is utilized to determine the degree of relationship among selected sets of time series. These correlations are then synthesized to yield general explanations of business fluctuations. The part that the statistician plays in the analysis of business-cycle causation is envisaged as subordinate to that of the economist. "Business cycles are essentially problems of economic life as a whole. Thus from the start we can be certain that the number of relevant 'variables' is large." The work of statistics is not confined to verification, or identification of what causes are operative, but it may encompass measurement of the strength of each cause and of the direction (positive or negative) in which it operates.

An Econometric Approach to Business Cycle Problems is an application of correlation methods to a simplified model of Dutch business life. Statistical variables are divided into three groups, namely (1) prices, (2) physical quantities, and (3) money values. Relationships among the variables are expressed by 22 equations, most of which have one to three terms besides that for the dependent variable. Thus the direct relationships among the variables of the model are simplified, but they constitute merely the first step in the analysis, the study of historical relationships. The second step is extrapolation on the assumption that no additional external changes, such as the introduction of a quota system, take place. This step is termed a determination of the "natural tendencies" of the system. A distinction is drawn between results where international quantities remain constant and those where there is an expected cyclical movement. Owing to the significance of international trade to economic life in the Netherlands, this part of the analysis is one of the most valuable contributions of the entire study.

Succeeding steps involve (1) finding the movements of the system after assuming given changes in the equations, or of finding the consequences of a given policy, and (2) finding the "optimum" variation, i.e., the best policy. The concluding chapter considers application of the methods to problems of

business-cycle policy, first to the possibility of revival at home without revival abroad through public works programs, protection, rationalization, lowering of monopoly prices, wage reductions, and devaluation, and second to the stabilizing of the "imported" business cycle by compensatory public investments and compensatory exchange rates.

The League of Nations' study is the second stage of its inquiry into the business cycle. Professor von Haberler's *Prosperity and Depression*, a theoretical treatment, was the first stage. Briefly, Tinbergen's contribution follows the same approach as his consideration of the Dutch model, but with different emphasis and objectives. The League monograph presents a short discussion of the logic involved, and of the method used, together with applications to fluctuations in investment, residential building, and net investment in railroad rolling stock.

Tinbergen is more interested in developing and applying a method than in obtaining dependable results. Although his inferences are suggestive, they cannot be used as established facts for the scope that they cover. How valid, for example, are his results on the fluctuation of investments in view of his assumption that profit increases are the cause of investment increases? Is there a further relation of profit to margins and volume of turnover that needs to be investigated before conclusions of cause and effect can be assayed? Lack of appropriate data is an obstacle to testing economic relationships. Rightly, Tinbergen is modest in his claims of proof. His task has been to go one stage beyond pure theory. These two monographs should be examined not so much for the results they show as for what they contribute to technique.

WILBERT G. FRITZ

University of Pittsburgh

Commodity Flow and Capital Formation, Volume One, by Simon Kuznets. New York: National Bureau of Economic Research. 1938. ix, 505 pp. $5.00.

Studies of business-cycle theory in recent years have dealt almost exclusively with the relation between fluctuations in capital outlays and national income. In this study Kuznets gives a careful statistical analysis of the development of capital formation and total production between 1919 and 1935. The close alignment between theory and statistical research makes Kuznets' investigation the outstanding statistical publication of the present.

Kuznets analyzes chiefly the flow of commodities for which he computes the annual totals at two different points. First, he computes annual totals of all finished commodities entering private consumption. These commodities are classified as perishable, semi-perishable, and durable. Residential construction belongs in the latter group but, like all construction, is treated

separately. Second, Kuznets measures the annual flow of finished commodities used by producers. Here a choice had to be made. The inclusion of all commodities bought by producers would have led to duplications which would have made the aggregates meaningless. Only durable producers' commodities are included, i.e., those producers' goods which last longer than three years. They, together with all other durable commodities and certain additional items, make up "gross capital formation." Since this total largely depends upon the definition of durable commodities, Kuznets perhaps should have explained more explicitly why he chose the three-year limit. George Terborgh, in his estimates of expenditures for new durable goods, excludes all expenditures not customarily charged to capital account. That seems to be a more consistent principle of selection than the durability of the commodity. Actually the decision depends on the purpose for which the total of "gross capital formation" is computed. In studying the business cycle we want "gross capital formation" to include all those expenditures which do not necessarily fluctuate with the volume of output. Since this is chiefly determined by the durability of a commodity and not by accounting practice, Kuznets' criterion is sound in principle.

The main source for computing the annual totals was the biennial Census of Manufactures. The many commodities produced were classified as finished or unfinished, producers or consumers, durable, semi-durable, or perishable. Commodities used by producers as well as consumers were included in a mixed group and later distributed proportionately according to estimated use. All construction and service materials were combined in special groups.

To determine the amount for which these commodities were sold to their users, it was necessary to estimate the freight charges and the distributive margins for the individual commodity groups. The latter estimate in turn required determination of the proportion of the goods sold by manufacturers to consumers directly, to wholesalers, and to retailers. The Census of Distribution and information from the Interstate Commerce Commission on freight charges were used, but many of the computations are estimates based on special information. Kuznets' totals differ depending on the method used in estimating these charges and markups, but he believes that the probable error is not too great. The computation of the volume of construction involved even more estimating.

Besides this analysis of the flow of commodities, Kuznets determines the net changes in the stocks of business inventories by comparing the volume of existing inventories at the end of the years. The value figures were deflated by special price indexes. The year-to-year differences thus obtained are representative of the changes in the physical volume of inventories. These changes were reflated to express the differences in inventories in current prices.

In a summary chapter, Kuznets combines the different series to obtain "gross capital formation." Several totals are computed, and, since the component series are given, the reader may modify the concept of gross capital

formation further. Kuznets fundamentally includes in gross capital formation the durable commodities, all construction, the net changes in inventories and in claims against foreign countries. This concept actually totals incommensurable things. Durable goods are added to net capital formation to obtain not only the sum of net capital formation after certain subtractions but also a new total of gross capital formation. Though the constituent series of this total all have a definite meaning, the usefulness of the total is not so obvious. Lauchlin Currie quite recently totaled all expenditures which absorb gross savings, and Kuznets' totals have a similar purpose. His commodity series are really the nucleus of Currie's computations, but other series must be reconsidered if the total is to express the absorption of gross savings. The savings-absorbing function of the public hand, for instance, is not represented by public construction but by total borrowing. Again, consumers' durable commodities should be replaced in this total by changes in consumers' credit, and even new items should be included, as I have written elsewhere.

This of course should by no means belittle Kuznets' contribution in this study to business-cycle research, and it may be repeated that the series on the production of durable commodities especially have great value. The determination of total savings-absorbing expenditures also has been greatly advanced, but it is still a field for fruitful study. In addition to its scientific value, to the student of statistics, Kuznets' work is an excellent illustration of how an important contribution to science can be ingeniously developed from relatively limited sources.

ALFRED KÄHLER

New School for Social Research

Distribution of Incomes and Fortunes, by J. van der Wijk. Haarlem: De Erven F. Bohn N. V. Netherlands Economic Institute. 1939. xv, 295 pp. hfl. 2.50.

Mr. J. van der Wijk is a Dutch economist who has made profound studies in the field of the distribution of income and wealth. The results of his investigations were partly published in the Dutch periodical *De Economist*.

The law of distribution of income, proposed by Mr. van der Wijk, is based on the assumption that "psychic income" is a logarithmic function of money income. This is equivalent to the assumption that marginal utility of money follows the Bernoullian hypothesis. Moreover, it is assumed that psychic income is distributed according to the law of Gauss-Laplace, its lower end corresponding to the subsistence minimum. The formula for this is

$$dF = \frac{2c}{\sqrt{\pi}} e^{-c^2u^2} du$$

where "psychic income"

$$u = \log \frac{x-m}{x_0}$$

or marginal utility of money:

$$du = \frac{dx}{x-m}$$

Here x represents money income, u psychic income, dF the probability function, m the subsistence minimum and x_0 is fixed, because $m+x_0$ must necessarily coincide with the median of the income distribution. c stands for the measure of precision of the Gaussian law. (When applied to the distribution of fortunes m is about zero.)

Van der Wijk's formula seems to fit fairly well to the statistical data for various countries and periods. Difficulties arise from the facts that x_0 does not appear to be very stable and that m seems to be related to the income level when the lower parts of the income distributions are excluded.

Among the other parts of this interesting book, we mention thorough discussions of the laws of Pareto and Gini, the law of averages, the Lorenz curve, and the measure of concentration proposed by K. G. Karsten. Considerable attention is paid also to Gibrat's investigations whose "loi de l'effet proportionel" is closely related to Mr. van der Wijk's law of distribution. Much attention is paid to the trend in the concentration of income and to its relation with the business cycle.

As the (modified) Bernoullian hypothesis on money utility is one of the basic assumptions of this theory, the author has to deal substantially with Frisch's objections against this hypothesis. A statistical verification of a distribution function, based on Frisch's expression for the marginal utility of money, leads to a refutation of Frisch's approach.

The last chapters of the book are devoted to applications in various fields: problems of taxation, relation between expenditure and income, computation of national income and national wealth including the people below the tax limits. Various conclusions reached are amenable to statistical testing. Hence this implies also a verification of the basic assumptions, underlying van der Wijk's theory.

J. B. D. DERKSEN

Central Bureau of Statistics
The Hague, Holland

National Income in the United States 1799–1938, by Robert F. Martin. New York: National Industrial Conference Board, Inc. N.I.C.B. Studies Number 241. 1939. xv, 146 pp. $3.50.

This book presents estimates of national income in the United States for

the 140-year period beginning in 1799. According to the estimates the annual income received by all individuals in the United States increased from less than $1 billion in 1799 to a peak of almost $80 billion in 1929. Even in terms of stable purchasing power, per capita income increased nearly threefold between 1799 and 1937. Estimates are presented by type of income—salaries and wages, entrepreneurial income, dividends, interest and rent—and by industrial origin—agriculture, mining, manufacturing, construction, trade, service and others. A final chapter describes the rise of Government as a direct source of personal income from 1 per cent in 1799 to a peak of 20 per cent of the total in 1936. What light this record throws on present problems, the author leaves to the reader's judgment.

The large increase in per capita deflated income, it is recognized, could be due largely to the fact that in earlier days many items of income were not sold for money, the cost of their production being the labor of the individual or the family. No attempt was made to estimate the degree to which this threefold increase represents a shift to a monetary economy, although it might have been tried by use of the shifting proportions of production income derived from various sources.

The author concludes that the advancement in economic welfare of individuals in the first half of the nineteenth century was much less than customarily supposed. Methods used for estimating the annual income decennially prior to 1899 were not, however, very reliable. The procedure generally adopted was the use of estimates based on the assumption of constant proportions and in some cases on correlations, but the author does not disclose how large his coefficients of correlations are, and no discussion of fiducial limits of estimate is included. In some cases the constant proportions assumed were in relationships that were known to have changed greatly during the period. In the chapter stressing the vast increase in proportionate income from Government sources, the great increase resulting from the transfer of activities from charities to Government is not adequately discussed. The figures on income from Government include bounties but fail to estimate the income produced for tariff-protected industries.

Interesting conclusions might be drawn from certain trends shown in the data. For example, the income data show that the first real advance in per capita income came in the forties. Was this because it was not until that decade that labor could organize for collective bargaining free from the restraint of conspiracy charges? The gain in income during the seventies was greater than in any other 10-year period in the nineteenth century. Was this because the country decided to adopt sound monetary policies and return to specie payment in 1879?

JAMES G. SMITH

Princeton University

The Structure of Manufacturing Production, A Cross-Section View, by Charles A. Bliss. New York: National Bureau of Economic Research. Publication Number 36. 1939. xvii, 231 pp. $2.50.

The purpose of this book is to provide an insight into the structure of manufacturing production. The theme is aptly suggested by Frederick C. Mills in his definition of the term "structure" as "the productive mechanism of an economy, considered with reference to its organization, the mutual relations among its working parts, and the character of the commodities it is geared to produce." This is a fit subject for investigation, in view of the vital changes that have taken place in the form of industrial organization, involving an increasing integration of corporate and technological relationships, and shifts in the geographical distribution of industry.

The statistical analysis is based on the data provided by the Census of Manufactures for 1929, chosen primarily because of the extensive and detailed information contained in that census. With the aid of this material, two major aspects of manufacturing operations are examined: first, the composition of the manufactured product and distribution of productive resources among different classes of manufactured goods; and second, the interrelations of productive factors in manufacturing operations—elements of cost comprising materials, wages, and overhead items, and productive factors including wage earners, salaried employes, and capital.

To facilitate the assembly and analysis of the data, products were examined industry by industry and grouped into four major classifications according to: (a) the destination of the ultimate product; (b) the stage of the manufacturing operation; (c) the durability in use of the final product; and (d) the source of the major material. A distinction is thus made between capital and consumption goods; finished and unfinished goods; durable, semidurable, and transient goods; and products made largely from farm, forest, or mineral materials.

The statistical treatment throughout the book is excellent—soundly conceived and executed. The study is purely descriptive, and comments are largely confined to truisms. The statistical data are replete with implications which, given a closer analysis, would provide a valuable contribution to our knowledge of manufacturing production. Repetitions of data given in the tables and the lack of inferential treatment make the text stubborn reading. But the author warns the reader that he has taken what amounts to "a 'still' photograph of a dynamic economy." The study is indeed a static approach, but it may be, as the author points out, a step toward an analysis of "the changes that mark the development of an evolving economic system." It is timely and suggestive.

C. A. SIENKIEWICZ

Federal Reserve Bank of Philadelphia

Market Control in the Aluminum Industry, by Donald H. Wallace. Cambridge: Harvard University Press. Harvard Economic Studies, Volume LVIII. 1937. xxix, 599 pp. $5.00.

If asked to name a monopoly in the United States, four out of five would answer, "aluminum." Dr. Wallace has undertaken to answer the two questions of why this is so, and what of it. He strengthens his analysis by parallel studies of European experience. And he describes in detail the interrelated developments of technology and shifting markets, for this is a case where technology has not so much lowered the basic cost as uncovered new uses for the product.

The answer to the first question involves explorations into technology, law, history, and psychology. At first a matter of absolute patent control, the domination of the virgin aluminum field seems to have resulted from a whole series of deterrents to other promoters, most important of which was the expansion policy of the initial company, its reserves of raw material and power, the scarcity of competent technicians, the time required to establish a new enterprise, and the absence of information relative to the costs and profitability of the industry. Thus a program of expansion which left no apparent open field, plus a series of partial monopolies on materials, power, skill, and information, with some tariff help, seem to have been responsible rather than the shotgun methods so often attributed to monopolistic growth.

On the second question, Dr. Wallace has not been as successful in finding a convincing answer. He has gathered an amazing amount of information, but one characteristic of the industry, and of the investigations which have been made of it, is that the record is exceedingly spotty. Time and time again, Dr. Wallace raises a point, indicates what sort of information he would need to find the answer, and then places a sign across the trail, "No Data." Nothing daunted, he frequently shifts under such circumstances from the pursuit of a factual demonstration to a theoretical analysis. He examines the relations of investment, output, prices, earnings, and demand; considers the "progressiveness" of the industry and its adjustment to short-run fluctuations of business. He explores particularly the situation of an industry where certain concerns operating at later stages are dependent upon a more integrated competitor for raw materials.

It is unfair to summarize Dr. Wallace's careful conclusions too briefly, but he appears to believe that vertical integration is desirable, that several enterprises rather than one would probably give more assurance of the public interest being served, but that an old-style competitive practice is impossible. He is highly critical of past government investigations and actions but seems to consider as a development of possible promise the establishment of government competition.

This is the type of literature which cannot help but be a great stimulant to economic thinking. As a statement of the economic conditions which surround a most important commodity, it raises the problems of monopoly and

oligopoly in very real terms. It suggests methods of analysis even where actual data are lacking.

This book was published in the Harvard Economic Studies series early in 1937. Since that time, the Department of Justice has brought suit against the Aluminum Company of America, but the course of the litigation to date has thrown more light on the complexities of the legal process than on the economics of the situation. It may eventually provide another chapter for the record.

WILLARD L. THORP

Dun & Bradstreet, Inc.

Die Industrialisierung Norwegens, by Allan Lyle. Jena, Germany: Gustav Fischer. 1939. viii, 101 pp. Rm. 5.–.

This is not a history of Norway's past industrial evolution; it deals primarily with the present and future. The author sketches in only enough of the historical and geographical background to acquaint the reader with the essential peculiarities of the Norwegian economy. The present distribution of the leading industries is described in some detail and displayed on a large folded map.

The question to which Dr. Lyle devotes the bulk of his attention is how the further industrial development of the country may best be fostered, assuming without question that further industrialization and greater national self-sufficiency are desirable.

The natural advantages of minerals, water transport, forests, fish, and water power provide the basis, in the author's opinion, for a considerable extension of manufacturing to meet home demands and for more initial processing of present raw exports.

Some of the obstacles are of the sort encountered in any small country: dependence on exports, low bargaining power in international trade because the domestic market is too small to make dumping profitable, difficulty in obtaining domestic share capital, and consequent high fixed charges in some enterprises and foreign domination of others.

In two respects, however, Dr. Lyle believes that Norwegian industry is peculiarly burdened: high taxes and high labor costs. He is at some pains to show—within the limits of validity of any international comparison of this sort—that business enterprises are taxed more heavily in Norway than in Sweden or Denmark or, indeed, in most other countries; and he ascribes to this a good share of the responsibility for the difficulties of Norwegian concerns in getting or accumulating capital for modernization of their equipment. The running of the government he regards as essentially a burden on industry. Apparently the funds raised by taxation are assumed to be spent in ways that have no relation to the Norwegian businessman's ability to meet international competition.

The author makes no attempt to prove that wage rates are relatively high in Norway but bases his contention of high labor costs primarily on the statistics of percentage of time lost in disputes, which in recent years has been much greater in Norway than in the other Scandinavian countries, England, Poland, or Belgium. France is not mentioned in this connection.

Without detailed proposals of his own, Dr. Lyle endorses what he reports as a widely held view in Norwegian business circles—that the best policy for the government would be to reduce the frequency of strikes (no method suggested), lower taxes on business, continue to encourage the curbing of cutthroat competition, and improve the machinery for the financing of industrial enterprises by shares. The active subsidization of the shipbuilding industry, and the continued support of certain other industries by tariff protection, is likewise approved.

He ventures some predictions as to probable new developments in aluminum (now being used for sardine cans!), Spitzbergen coal, larger shipyards, electric steel, calcium carbide, synthetic liquid fuels, rayon, hydrogenation of whale oil, and the use of charcoal gas in trucks. In the main, however, it seems that the book's purpose is to make Norway more industry-conscious and to urge the adoption of governmental measures for the active encouragement of private enterprise in existing industries.

EDGAR M. HOOVER, JR.

University of Michigan

Economic Adaptation to a Changing World Market, by Carl Major Wright. Copenhagen, Denmark: Einar Munksgaard. 1939. 305 pp. 10*s*.6*d*.

State intervention in response to unfavorable economic conditions frequently takes the form of an attempt to bolster the very economic organizations which, by obsolescence and consequent inefficiency relative to contemporary norms, serve most to weaken the competitive position of the given economy in the world market. It is Mr. Wright's thesis that an opposite policy designed to encourage a transition to a more satisfactory industrial structure is always possible. The present book is a discussion of this possibility and of the principal questions which arise in any attempt to work out such a program of adaptation on a rational basis.

The author is primarily concerned with the plight of small countries for which permanent isolation from the world market is undesirable and for which intervention with a view to control or influence world prices is impossible. For such countries, the only long-term policy available is one of readaptation to changing world conditions whenever it becomes apparent that such adverse changes are of a permanent and not merely cyclical character. Such readaptation must involve a shift to new industries which will provide a larger and more stable income. As to the selection of the new industries to

be encouraged, Mr. Wright adopts the general principle that new commodities always provide the most satisfactory occupation for national economic resources. These new commodities have the advantage of combining high price and income elasticities of demand, which with the expected long-run upward trend of income and downward trend of price for new commodities assure rapidly increasing demand, with a high price elasticity of supply which protects the new industry against excessive price cutting. With proper timing, the author feels, a shift toward young expanding industries will always be desirable.

Unfortunately the central portion of the book fails to improve appreciably the argument presented in the first and last chapters; the general level of the discussion is very superficial for a question as complex as the one at hand. It is, of course, extremely difficult to carry through a painstaking investigation of the general question of adaptation, since the whole matter demands a reasonably accurate picture of the macrodynamic structure of the world economy and of the structure of national and international business cycles. The result is perhaps most acceptable if one regards the book as a suggested outline for a more thorough treatise.

F. W. DRESCH

University of California

The Paradox of a Metal Standard, A Case History of Silver, by Anatol Murad. Washington, D. C.: Graphic Arts Press, Inc. 1939. xii, 212 pp. $2.50.

Vilfredo Pareto avoided the controversial connotations of contemporary problems by choosing most of his examples in the *Trattato* from antiquity and the Middle Ages. In the present book, which is written with the purpose of showing the undesirability, under modern conditions, of any kind of metallic monetary standard, the author follows a similar plan, by avoiding a direct discussion of the gold standard and going thoroughly into the monetary history of silver. He does this because, as he says, silver is pretty generally considered a closed chapter, if not by politicians, at least by economists, many of whom, on the other hand, still support the gold standard. The conclusion of the book is that "neither gold or silver, nor any other commodity can have any connection whatever with the standard of value," and that "a standard of value is a vague concept of an ever-changing magnitude of purchasing power and cannot be embodied in a concrete measuring instrument" (pages 186–87).

Although that is the main purpose of the book, it incidentally provides an excellent brief summary of the past difficulties of bimetallism, the gradual rejection of silver as money, and the unsuccessful silver policy of the present administration. A few errors of fact may be found, as is almost in-

evitable in a survey so widely extended in space and time. For example (pages 66–67), it is stated that the Indian silver rupee after 1893 was made exchangeable into gold or foreign exchange at a fixed rate. The exchange of sovereigns into rupees was provided for, but, although the government of India somewhat tardily in the crisis of 1908 and again in 1914–15 sold sterling exchange ("Reverse Councils") for rupees, it was under no statutory obligation to do so until the passage of the Indian Currency Act of 1927.

The author shows that the American silver program did not accomplish any of the ends claimed for it. It forced China off a metal standard, and the author feels that the smoothness with which that country accomplished the transition to a managed currency should be enlightening to advocates of a "traditional" gold standard. As to the monetary future of silver he says: "It seems unreasonable, therefore, to expect a continued use of silver as a currency medium, unless a radical change in the trend of civilization should upset all predictions" (page 174).

DICKSON H. LEAVENS

Cowles Commission for Research in Economics

National Bank Failures and Non-Failures; An Autopsy and Diagnosis, by Horace Secrist. Bloomington, Indiana: The Principia Press. 1938. xix, 309 pp.

This study of balance sheet items of 741 national banks which failed during the years 1925, 1929, 1930, 1931, and 1932 and of 111 banks continuously in operation during 1920–32 is based essentially on the assumption that banks do not "die a sudden death," but show their weaknesses beforehand.

Briefly, the analysis rests on the comparative trend of total [yearly] resources, of deposits, of loans and discounts, etc.; comparative changes in each of these items for individual banks; yearly ratios between loans plus discounts and deposits, between total deposits and total resources, between total capital funds and total deposits, between total capital funds and total liabilities, etc.; and the comparative behavior of failing and non-failing banks, and of earlier and later failures. This comparison between failures and non-failures is fundamental to the inquiry and is supported, in many instances, by detailed comparisons for individual reserve districts as well as groups of reserve districts and all districts, and finally, for banks classified by size groups.

The foregoing is only a bare outline. As the author makes clear, it is by no means an exhaustive study, but, within the field surveyed, it is undoubtedly a highly informative contribution to our knowledge of the subject. The analyses effectively support the author's major contentions, which, it should be noted, are stated very conservatively. Secrist's own opinion with regard to what his autopsy proposes to show and finally shows is best reflected in his

own statement that "it is not possible looking forward from, say, 1927, to forecast the time of failure or the fact of survival. The best that can be done from such a vantage point is to hypothesize that, if failures occur, the order in which banks will 'die' will be that which is found to obtain." To the obvious question "do these relationships as shown for past failures and non-failures hold for the future?" Secrist replies that "they may be significant as a basis for judgement of what is likely to occur in the future . . . they are expressive of tendencies . . . they make it relatively certain that rigid prescriptions defining safe and unsafe banking practices are specious and illusory." Nevertheless, the author is also convinced that "the comparative results which an analysis of this type discloses constitutes standards in keeping with which certain aspects of bank management and supervision can be rationally determined."

Two serious difficulties are mentioned: inadequacy of balance sheet data and absence of data for state banks. Within the present study the analysis is often restricted to events during one or two years and, therefore, to a very small number of banks. Again, the comparative analysis as between banks of different size is far too sketchy, for the reason just noted as well as because of the method employed in grouping banks by size. As between banks in different locations, the problem is disposed of by restricting the analysis to a comparison between banks in different reserve districts. Since one of the author's major conclusions is to the effect that the indicated symptoms of weakness are independent of the size and the location of banks, as well as of the year of failure, one would wish that these three factors had received more equal treatment, and that the analysis had not been primarily restricted to the time factor.

C. DANIEL BREMER

New York City

British Wages Boards, A Study in Industrial Democracy, by Dorothy Sells. Washington, D. C.: The Institute of Economics of The Brookings Institution. Publication No. 77. 1939. xv, 389 pp. $3.00.

This book, a lucidly written and informative account of the establishment and functioning of the British Wages Boards, is largely a sequel to Miss Sells' report on *The British Trade Boards System* (1923). It therefore summarizes the record of nearly 30 years of British experience since the Trade Boards Act of 1909. The major British undertaking in statutory wage regulation is the Trade Boards System. In October 1938 there were 49 Trade Boards in operation, 47 of which had already fixed wage rates. Two had been newly formed, and two more were about to be formed, making a total of 51 Boards. As of October, there were 1,136,000 persons "normally seeking employment in trades covered by Trade Boards." No heavy industry was

included under the Boards, and about 70 per cent of the employes covered were women.

The field within which Trade Boards may be set up was redefined in the Trade Boards Act of 1918. The Trade Boards Act of 1909 had listed, as one of the necessary conditions, that wages must be "exceptionally low" in the industry for which a Trade Board was proposed. This standard goes back to the campaign against sweating which was a major element in the passage of the Act. In the 1918 Act, this requirement was omitted. The prescribed conditions now are: "(1) that there is no adequate machinery for effective regulation of wages throughout the trade, and (2) that it is expedient to apply the Act, having regard to the rates of wages prevailing in that trade."

Trade Boards consist of equal representation of labor, industry, and the public, the function of the public being to reconcile differences of the two representative sides. The Boards establish rates through a process of negotiation. Generally, small committees selected from the Board's representative membership hold preliminary conferences with the appointed members before putting the rate proposals before the full Board. Official data on wages, employment and the cost of living, sometimes materials collected in special inquiries, and, occasionally, balance sheet information are presented for consideration in the course of negotiations. While basic statistics of this type have been somewhat scanty in the past, "the trend lies in the direction of increased presentation of definite data."

In a brief discussion of the effects of the Trade Boards System, Miss Sells indicates that the System has stimulated the organization of employers and raised the plane of competition; that the practice of consultation of employers and workers tends to reduce industrial disputes and foster collective bargaining generally and that the Trade Boards are believed to have stimulated unionization; that the Trade Boards have stimulated increases in industrial efficiency and industrial standardization; and that there has been a sharp decline in homework, due principally to the setting of rates equal to those paid in factories and to the trend towards mechanization. While direct evidence of the effect of Trade Boards on annual income of the covered employes is not available, Miss Sells shows that the wage rates paid under Trade Boards have risen above the subsistence level (based on benefit payments) and are now closer to the "human needs level" (B. S. Rowntree, *The Human Needs of Labor*, 1937). Data on unemployment in industries under 18 Trade Boards are presented in comparison with data for an equal number of industries not subject to statutory wage regulation. These figures show that most Trade Board industries had lower percentages of unemployment in 1927, 1932, and 1937 than industries in the other groups.

Using a ratio of 75 per cent to represent British living costs compared with those in the United States, and calculating on the basis of a 48-hour week, Miss Sells estimates the average minimum time-rates under Trade Boards for adult male workers and adult female workers, as of December 31, 1937, at

$16 and $9 per week, respectively. These are admittedly rough equivalents, but may be compared with $12.60 per week now paid for 42 hours of work under the general minimum rate of 30 cents per hour provided by the Fair Labor Standards Act.

The increase in the number of Trade Boards has been very gradual. The application of a general minimum wage to all industries has never been strongly advocated in Great Britain. The tendency has been, rather, to approach a partial equivalent of a general minimum through the minima set by individual Trade Boards. It may be remarked, of course, that there is an obvious alternative in the attempt to regulate practically the entire wage structure, namely, to set general minima and to allow the interplay of existing and developing economic forces and institutions to determine the superstructure of wages.

Wage regulation under Trade Boards is quite elaborate, allowing for a large number of types of wage differentials. These differentials appear to have been put into effect successfully, with little objection from either industry or labor. Probably the only notable exception is the strictly regional differential, which has been generally regarded as unsatisfactory. It has been considered unwise to establish wage differentials between the northern part of England where wages are generally high, and the southern part, where wages tend to be low.

Of fundamental importance in the Trade Boards system is "the established practice of the British Parliament to draw such acts (social and industrial legislation) in terms of broad principle and general procedure, leaving designated administrative authorities to fill in the details by statutory rules and orders having the effect of law. Thus, in addition to enforcing the law, administrative authorities perform a quasi-legislative function. . . . By such act, Parliament returns to the people, on a functional basis, a portion of the legislative power originally delegated to it by the people on a geographic basis. The effect of this is to lay the foundations of industrial democracy."

The widespread dissatisfaction with statutory wage controls in 1921–22, arising from the severe business depression, subsided when business turned upward. In all, the record of 30 years of continuous functioning of an elaborate system of statutory wage regulation in a highly industrialized country is impressive and encouraging. It is to be hoped that increased attention to the development of a statistical record will make subsequent appraisals of the economic influence of the Trade Boards more substantial and will promote the still more successful operation of this important system of democratically managed, statutory wage regulation.

CARROLL R. DAUGHERTY

U. S. Department of Labor

Prices and Wages in England from the Twelfth to the Nineteenth Century. Volume I—Price Tables: Mercantile Era, by Sir William Beveridge. New York and London: Longmans, Green and Co. 1939. lx, 756 pp. $12.00.

Prices and Wages in England, the first of a contemplated series of four volumes covering the history of prices from the middle of the twelfth century to about 1830, ranks as a source book such as exists for no other country. Volume I spans the whole Mercantilist Period, defined for price purposes as 1550–1830.

Sir William Beveridge, who initiated and took responsibility for the whole English price project, had long been engaged in research in the unique manorial records of Mediaeval England, with particular interest in wheat prices. In 1929, he extended his work and actively co-operated with similar studies in other countries. Thus, the scope of the present study and its form may be attributed to the attempt of the International Scientific Committee on Price History to conduct research in some of the more important modern countries. As the author explains, the present volume "appears as one of a coordinated group of studies covering, with varying degrees of completeness, Austria, England, France, Germany, Holland, and the United States of America, from the earliest time for which data have been discovered to the beginning of the nineteenth century or later." To the above list should be added studies in Spain and some other countries.

In many ways the English studies are unique. They represent by all odds the most extensive work sponsored by the International Price Committee. No other country yielded continuous data which started as early or spanned as many years. In fact other countries found so "relatively little to set beside the English results" in the Manorial Era that precedence had to be given to a later era "to work so far as possible at the same time at the same periods of price history." The English series are based wholly upon institutional records in which the methods and conditions of purchase and often the uses made of the articles are reasonably clear. Further, only those records were tabulated which were complete enough in themselves to form an independent series for each area without resort to other sources or to isolated entries to fill gaps.

First place in the volume is given to primary data and to descriptions of the elements which would influence prices at each of the 12 institutions including schools, hospitals, and government departments from which price data were drawn. These sources were: Winchester College 1393–1817; Eton College 1444–1830; Westminster (School and Abbey) 1574–1830; Charterhouse 1644–1830; Sandwich (St. Bartholomew's Hospital) 1543–1766; Greenwich Hospital 1712–1828; Chelsea Hospital 1702–1810; Lord Steward's Department 1659–1830; Lord Chamberlain's Department 1556–1830; Royal Works 1552–1814; Navy Victualling 1683–1826; Naval Stores 1566–1813. Prices actually used were almost exclusively purchase prices, limited to those representing a free bargain between buyer and seller.

The author supplies for each institution brief introductory notes which give the changes in forms of accounting, in conditions of purchase, in management of the institutions, and in customs of the time which would affect the form and value of prices. Similar notes accompany the record of each commodity showing special problems such as units of measure, specifications, or other irregularities connected with its pricing. General historians will find much in these explanations to interest them in the value of institutional records for study of social changes. One must read these notes to appreciate the accuracy and care with which the work has been done. Everywhere internal evidence was sought in the records to establish weights, special taxation, unusual delays in payment, as well as changes in the use and quality of the commodity.

The authors have gone a step in the direction of summary by furnishing 58 pages of price relatives for major articles by institutions. They have reduced all series to common weights and a common unit of value, though all values represent contemporary currency. It will be an incalculable service to economic historians if the work can be completed by Sir William Beveridge and his associates who alone have the background to interpret the data.

In so far as possible in the study of prices at English institutions, doubtful items have been rejected, and, in other cases, warnings are inserted to call attention to possible inconsistencies. Wherever it was possible the author has either adjusted prices or provided a basis for the adjustment. In the light of these problems, no reviewer could fail to point out the need for as great accuracy in the subsequent use of the tables and the explanatory text as has gone into the preparations of the study.

Economic historians now have for England the needed materials for the analysis of price movements over long periods of time, assembled with awareness of the differences between market areas and character of price series. In its present form the original data invite comparative studies between institutions. They provide, besides, material long needed for certain regional comparisons.

ANNE BEZANSON

University of Pennsylvania

The Case for Experience Rating in Unemployment Compensation and a Proposed Method, by Herman Feldman and Donald M. Smith. New York: Industrial Relations Counselors, Inc. 1939. viii, 66 pp. $1.00.

It is curious that some of the most severe criticisms of "merit rating" in unemployment compensation laws have been made by personnel of the Social Security Board under whose guidance such provisions were included in state laws, while the most effective defense of "merit rating" now comes from two persons who have had no connection with that Board. The authors

of this pamphlet defend the principle of individual employer reserves as a basis for rate differentiation. They defend, also, the practice of charging off benefits against the most recent employer in cases where a beneficiary had been employed by several concerns. This defense is made not only on the grounds of administrative simplicity, which is understandable, but also on the more debatable grounds of equity.

While conceding a few minor defects in the present "merit rating" plans, the only major criticism accepted by the authors is the failure on the part of the Social Security Act to require some degree of uniformity in the state acts to prevent the development of unfair competition resulting from the diversity of "experience rating" plans.

The discussion of "merit rating," or "experience rating" as the authors prefer to call it, has not been advanced much by this pamphlet. Its main contribution is in the analysis of administrative defects involved in the various types of plans. The most urgent need in the development of national policy is to achieve some agreement as to the objectives of "experience rating." The authors of this pamphlet assume, without much discussion, that the objective is to prevent lay-offs regardless of causes or consequences. Apparently no concern is given to the volume of employment so long as it is distributed among a stable working force. Perhaps this would have been the primary objective of unemployment compensation in the 1920's when we had relatively little unemployment. But today, with ten million or more individuals apparently excluded from private employment, other objectives ought to be given consideration. For these ten million, instability is not so bad so long as there is employment.

HARRY WEISS

Wage and Hour Division, U. S. Department of Labor

The Problem of Retail Site Selection, by Richard U. Ratcliff. Ann Arbor: University of Michigan, Bureau of Business Research. Michigan Business Studies, Volume IX, Number 1. 1939. 93 pp. $1.00.

During the past decade the problem of retail site selection has gradually yielded to quantitative analysis based on street-frontage mapping, personal interviews, pedestrian counts, city directories, and census data. In this study Mr. Ratcliff has contributed to an understanding of the problem by measuring the block-frontage affinity of an array of retail types to seven control types. Polk directories and zoning maps showing the location of central business districts were used for 24 cities ranging in size from Detroit to Miami.

"A tabulation was made of the uses appearing in the same block units where representatives of each of the seven control types were found. The first step in this tabulation for any one city was to locate all the representatives of the control type . . . in the central business area. Having spotted

all block units in which [the control type] appeared, a listing was made of all stores in those blocks." Analysis revealed the outstanding affinity of women's clothing stores, shoe stores, and variety stores for department stores; affinity of women's clothing stores and shoe stores for variety stores; greater diversity within blocks containing shoe stores; absence of any particular association with jewelry stores; affinity of restaurants and men's and women's furnishings outlets for furniture stores or florist shops; and affinity of restaurants, men's furnishings shops, shoe stores, and jewelry stores for theatres.

This analysis of spatial relationships was followed by a consideration of location characteristics and buying habits of purchasers. A refinement of the Copeland classification of "shopping goods," "specialty goods," and "convenience goods" was suggested by differences in the buying habits of men and women and by the postponability, selection, and frequency of purchase of certain goods. In addition, the study considered practices of chains in selecting business sites: quantitative and qualitative pedestrian counts, analysis of transportation facilities and neighborhood purchasing potentials, comparison of corner and center-of-the-block sites, and evaluation of the success of similarly placed establishments.

The method and data employed in analyzing retail block-frontage affinities have several faults stated or suggested by the author. Use of directory lists precluded qualitative selection of establishments by street-frontage size, number of employes, or volume of sales. Dissimilar physical controls affecting growth of cities, inertia of retail types maladjusted to site, and shifts in tributary population have functioned to create heterogeneity where otherwise there might be predictable structural order. This work marks a beginning in the analysis of retail affinities. Other studies should be initiated using not only directories but street-profile maps, census data, and special questionnaires so that present conclusions may be tested and also extended to all phases of city retail structure.

M. J. PROUDFOOT

U. S. Bureau of the Census

Cleveland Market Data Handbook, 1939 Edition, by Howard Whipple Green. Cleveland: Real Property Inventory of Metropolitan Cleveland. 1939. 53 pp. $1.00.

Into the 63 charts and 27 tables of this handbook, much economic information on Cleveland and Cuyahoga County has been packed. Annual data for some series from 1900 and others beginning with the war years or soon thereafter tell a story of growth and of grief. Good charts and very readable tables, linked by cross reference and accompanied by a detailed index, make the booklet handy for quick reference. For the more deliberate reference,

particularly for analytical comparison rather than general impression, the brevity of explanatory matter will be a noticeable handicap.

One point of arrangement is unfortunate. As "market data," the graphic record of growth of Federal debt and expenditures (charts 5 and 6) seems conspicuously removed from the supplementary record of the reduction of local governmental revenues and debt in Cuyahoga County (charts 54, 55, and 56).

J. P. WATSON

University of Pittsburgh

Consumer Market Data Handbook, 1939, by Ben P. Haynes and Guerry R. Smith. Washington, D. C.: Department of Commerce, Bureau of Foreign and Domestic Commerce. 1939. xxi, 464 pp. $1.75.

This handbook, the fourth of a series, presents for states, counties, and, where data are available, cities of over 2,500 population 62 separate original statistical series and 20 derived series. The latter include per capita figures, percentages of totals, as well as a new set of quotients called Index of Place in Local Sales, intended to indicate local type of store preference but which also show type of commodities purchased.

The series are divided into five sections giving general population characteristics in 1930, principal economic activities in 1935, earnings of wage earners by industry in 1935, supplementary and indirect evidences of income and material well-being (income tax reports, 1934–35, radios, telephones, magazine circulation), and distribution of retail sales by type of store in 1935. The series were selected mainly from suggestions of advertising agents, marketing analysts, and professors of marketing. Many of the series have not been published elsewhere.

If one were to criticize the handbook, it would be for the inclusion of so many derived series in place of additional primary data. Since, unfortunately, most figures are more than four years old, it might have been well to give more series for a common year, 1929, and to show for principal series, such as manufacturing and total retailing, data for several years to help formulate estimates. Such commonly used material as automobile sales might well have been included. Some of the secondary series should be eliminated or restricted to counties and presented in a separate tabulation. The handbook is a fine enlargement of previous editions. Its neatness and compactness will appeal to businessmen and research workers.

DAVID SCHENKER

University of Pittsburgh

Industrial Market Data Handbook of the United States, by O. C. Holleran. Washington, D. C.: Department of Commerce, Bureau of Foreign and Domestic Commerce. 1939. iv, 907 pp. $2.50.

The *Industrial Market Data Handbook* contains chiefly data on location and extent of manufacturing and mining activity. Indeed, over three-fourths of it is a tabulation of the number and kind of manufacturing plants in each county. Total manufacturing activity is shown for cities with population over 10,000, for counties, and for each of the 33 industrial areas; the geographic limits of the industrial areas, however, should not have been omitted. For specific industries, manufacturing data are shown for the United States only; county data for bituminous coal (erroneously labeled "all coal"), metal, and total mining are presented also. Brief but significant inclusions are tables on marketing channels employed by important manufacturing classes, with detail on location, by county, of wholesalers for specified lines. Some of the information was specially tabulated and published here for the first time.

Undoubtedly, the extensive data combined in this volume will be of considerable value to marketing specialists and others. In future editions more attention should be given to condensing, without loss of data, the many pages on location of manufacturing plants and at the same time indicating within some limits the size of the concerns. Statistics by industry for the 33 industrial areas and for states would make the handbook more complete. Tonnage figures for coal are another possible addition.

DAVID SCHENKER

University of Pittsburgh

Aperçu de la démographie des divers pays du monde, 1929–1936. La Haye: Office permanent de la Institut International de Statistique. 1939. 433 pp. Fl. 8.

The last previous volume of the International Statistical Institute's statistical survey of world demography was for 1931. The Secretary of the Permanent Office assures us in his introduction that henceforth the publication will remain an annual one, but recent events may prevent the fulfillment of this intention. The new tables and other innovations generally represent commendable improvements.

There are two tables showing population by age, one by broad functional groups and the other by narrower intervals. Many of the other distributions are also given by age and sex. In addition to the usual population totals, sex ratios, and densities, we find statistics on religious affiliation, illiteracy, country of birth, juridical nationality, language, and certain physical and mental impairments.

The subjects of marriage and divorce are covered in great detail, through both census and vital statistics. Among the more unusual tables are one

giving the average annual number of new marriages per 1,000 marriageables 15 years and older by sex and previous marital condition and another giving an ingenious cohort arrangement representing the number of single persons at age n remaining from a radix of 10,000 at age 15. One can find also the number of marriages that are the initial matrimonial venture for both parties and divorces distributed by duration of marriage or by number of children born. In the statistics of marriage and divorce, the United States is usually represented by only four or five states.

This publication for the first time gives gross and net reproduction rates, although as yet no intrinsic rates of natural increase are shown. Age-specific fertility rates are both tabulated and graphed for a number of countries. There is also a table of births per 1,000 women 15–44 years of age in both the actual and stationary populations, the ratio of these measures yielding Burgdörfer's approximation to the net reproduction rate.

Crude death rates are supplemented by death rates in the stationary population, the latter with its control of age-composition representing an excellent index of relative mortality. Moreover, its reciprocal, the complete expectation of life at birth, is given for a much longer list of countries. Tabulations of the functions $\mathring{e}_x$, l_x, and q_x make up an extensive section on life tables. The absolute number of deaths by cause is given for several different years. Unfortunately, there are no cause-specific rates nor is the incidence of these causes by age and sex ever shown.

Qualifying notes indicate the areas or races not covered, but there are no notes to warn the reader of the highly approximate character of some of the figures. Some vital rates for 1937 appear in special tables that were evidently prepared after the main tables were ready. *The Statistical Year-Book of the League of Nations*, which came out only two months later, carried many rates for 1938. When the *Aperçu* appears annually, a special effort should be made to include more recent figures in a preliminary table.

HENRY S. SHRYOCK, JR.

U. S. Bureau of the Census

The Health of College Students, by Harold S. Diehl and Charles E. Shepard. Washington, D. C.: American Council on Education. A Report to the American Youth Commission. 1939. viii, 169 pp. $1.50.

This book reviews the health problems of students in American colleges and defines these problems in respect to the ability of the various colleges to solve them. It was found that there were no statistics on health programs in the American colleges until about 15 years ago. The only type of health education which prevailed was physical education and gymnastic work.

The authors review the incidence of nutritional defects, defects of vision, dental caries, defects of heart and lungs, defects in circulation, as well as the result of various blood and urine tests among college students. The fig-

ures are based on a survey of some 4800 individual health record cards. This book also describes the facilities of the various institutions for bed care, health inspections, psychiatric aid, and other advisory departments.

More than two hundred colleges submitted information on their health service programs, and these data were subjected to careful analysis, in regard to "budget per capita, staff service per thousand enrolled students, health examination procedures, out patient service, infirmary or hospital care and public health service." These data were subjected to statistical analysis in order to learn whether "certain groups of colleges might have similar administrative problems, budgetary resources, staff organizations, and activities."

The results of the study seem to show that the success of any health program undertaken in college depends upon four things: "student health service, campus public health service, classroom instruction in health matters, and physical education as a health activity." This volume is a valuable contribution to a field in which little statistical research has been done. It probably will serve as an impetus for further investigation of the health problems of an important segment of the population.

MYRON S. HEIDINGSFIELD

United States Public Health Service

The Dynamics of Higher Education, by Walter A. Lunden. Pittsburgh: The Pittsburgh Printing Company. 1939. xviii, 402 pp. $4.25.

In applying new methods of analysis to an important empirical field just coming into the orbit of sociological studies, Professor Lunden is to be heartily congratulated. The fact that his work is incomplete, uneven in quality, and to a considerable degree unsystematic should not be allowed to obscure the fact that he has made a pioneering contribution to the sociological analysis of higher educational institutions. The weakness of the work lies chiefly in its failure to indicate the very real limits of its own undertaking.

It is certainly not, for example, "a full length sociological analysis of the institutions of higher learning in the western world," as the author claims. Many institutions are omitted, and only certain aspects of the others, mainly quantifiable, are considered. Nor is the treatment always "sociological in contrast to many historical or philosophical works." The fact that the treatment may be neither historical nor philosophical does not suffice to make it sociological—nor does the extensive use of statistical descriptions. The treatment of most aspects of the subject is actually far too cursory and superficial to make either good history or good sociology. Quantitative variables are essential to both, but they tell only a part, and often not the most important part, of the story.

Even on the quantitative plane of analysis the book is open to serious criticism in several places. For example, the author goes to great labor to

indicate what he calls "the occurrence of higher educational institutions in the western world" by listing their foundation dates and then noting the temporal distribution. It does not appear to worry the author, although he does take cognizance of the fact, that his source has revealed to him the foundations of only those institutions which existed in 1930.

In discussing the important matter of "internal" vs. "external" selection of teachers the author presents copious data derived from more than 10 American universities, 24 colleges, and four technical institutes, but when one notes that "internal selection" has been defined as appointment of an individual who has taken *any* work at the institution which appoints him, a large part of the significance of the data disappears. What significance has such a classification? What light can it possibly throw on the basic problem of selection which the data were intended to illuminate?

Most serious of all, from the methodological viewpoint, are the weaknesses of the "turnover index" utilized in describing "horizontal mobility," i.e. proportional gains and losses on faculties. This "index" is defined as the ratio of the losses or the gains (whichever is the smaller) during a given year to the size of the whole faculty at the beginning of that year. The index thus disregards the size of the group and gives misleading results through restricting the notion of "turnover" to "replacement," an identification which was popular in the early twenties but is now generally abandoned. The statistical inadequacy of the ratio can easily be seen if one takes two extreme cases, obviously incomparable, both of which, however, have the same "turnover index" by Lunden's method of computation. (A) Original Staff = 100, Losses = 2, Gains = 2, New Staff = 100. (B) Original Staff = 100, Losses = 50, Gains = 2, New Staff = 52. In both cases the "turnover index" is 2. (Cf. the reviewer's forthcoming article, "Metabolism Indices and the Annexation of Austria," where the matter is discussed in detail.)

It is unfortunate that so ambitious a work should have been so carelessly edited. The reviewer has noticed at least 19 misspellings of proper names as well as a number of faulty sentences, misused words, and garbled Latin quotations. As an expert in this field Dr. Lunden should know that the term *Hochschulen* (which he confuses with *höhere Schulen*) refers to universities and not to *Gymnasia*. Since he ventures into the difficult medieval field he should have been able to avoid the curious effect of discussing over several pages the two Amselms (of Lâon and Bec) as if they were one and the same man. Since he refers to Rashdall's famous work no less than 36 times, he should have shown his awareness of the thoroughgoing 1936 revision by Powicke and Emden instead of relying only on the 1895 edition. Nor are Hegel and J. W. Draper the best of historical sources for the middle ages.

If sociologists desire to fancy themselves superior to the "plodding" historians, then let them first show, where the fields overlap, that they can be as good.

E. Y. HARTSHORNE

Harvard University

Principles of Urban Real Estate, by Arthur M. Weimer and Homer Hoyt. New York: The Ronald Press Company. 1939. xiv, 332 pp. $4.00.

This book makes a theoretical, methodological, and practical contribution to the field of urban land economics by bringing together from many sources not only the latest findings of private, institutional, and governmental investigations, but the rich results of years of research by the authors. On the theoretical side, cities are analyzed with respect to relation to national economic life, functional and dynamic character as to type and structure, and cyclical fluctuations of real estate market values. Methodology is served by an exposition of tested techniques for analyzing economic background of cities, city structure, districts, and neighborhoods; and urban real estate market. Finally on the practical side, the realtor is guided by an exposition of how to evaluate individual property holdings, how to subdivide and build new developments, through what agencies and how best to finance new developments, how to sell and transfer property, how to manage property, and the private and governmental means for property control.

Of specific interest is Hoyt's *sector theory* explaining the growth of residential occupance, which supplements the over-generalized radial and concentric circle theories of Henry Wright, E. W. Burgess, and others. According to Hoyt, "if an entire city is considered as a circle and the various areas in it as sectors radiating out from the center of that circle, then the high rent areas starting in the center of the city move outward toward the periphery in one or more sectors in a straight line as development occurs over a period of years. Similarly, if one sector of a city develops as a low rent area, it will tend to retain that character for long distances as it extends itself in the process of growth." This theory is well illustrated by maps of Chicago and Miami.

As in virtually all textbooks, content appears to have been sacrificed in part, to a rigid outline. Wide coverage abstracted into limited space has resulted in some easy generalizations, more coherent than convincing, and the laudable inclusion of specialized research findings has not always been skillfully woven into the general theme. Notwithstanding these shortcomings, the present status of urban land economics has been ably summarized and made palatable for the uninitiated.

M. J. PROUDFOOT

U. S. Bureau of the Census

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Chapters of the Association have been organized in important cities in the United States. Information concerning the meetings of these chapters may be secured from the District Representatives listed on another page.

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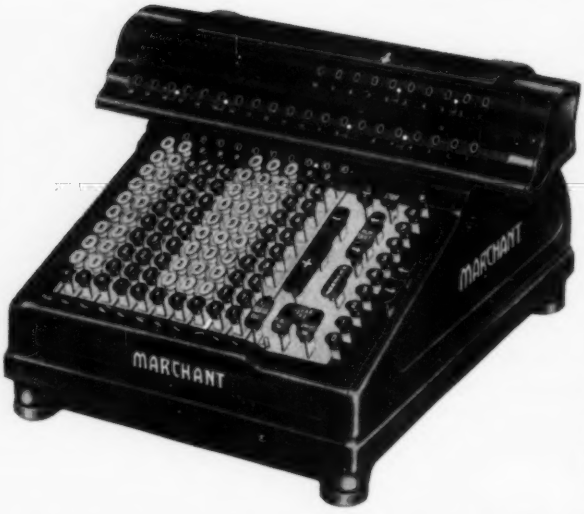

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